E/753

U. of I. Lib.
JUN 8 1971
Chicago Circle

ECONOMIC SURVEY OF EUROPE 1969

Part 1: Structural Trends and Prospects in the European Economy

UNITED NATIONS

Digitized by the Internet Archive
in 2024

https://archive.org/details/economic-survey-of-europe_1969_part-1

UNITED NATIONS

ECONOMIC SURVEY OF EUROPE IN 1969

PART I

STRUCTURAL TRENDS AND PROSPECTS IN THE EUROPEAN ECONOMY

Prepared by the
SECRETARIAT OF THE
ECONOMIC COMMISSION FOR EUROPE
GENEVA

NEW YORK, 1970

E/ECE/753

UNITED NATIONS PUBLICATION

Sales number: E.70. II.E. 1

Price: $U.S. 2.50
(or equivalent in other currencies)

Prefatory Note

This study is one of a series of reports prepared by the secretariat of the Economic Commission for Europe and published in the annual *Economic Survey of Europe* and *Economic Bulletin for Europe*. The purpose of these studies is to serve the needs of the Commission and to help in reporting on world economic conditions—a task which the Economic and Social Council of the United Nations has entrusted to the Department of Economic and Social Affairs.

The present study is published as Part I of the *Economic Survey of Europe in 1969*. (Part II, which has already been published, deals with the European economy in 1969.) This text is substantially the same as that which was submitted to the Commission at its twenty-fifth session, held in April 1970, for background information.

This SURVEY is published on the responsibility of the secretariat of the Economic Commission for Europe, and the views expressed in it should not be attributed to the Commission or to its participating governments.

May 1970.

CONTENTS

Structural trends and prospects in the European economy

CHAPTER 1

Page

Introduction 1

CHAPTER 2

Growth and structural change in the centrally planned economies 5

2.1 Trends in output, employment and output per man—1950-1967 5
  (i) Problems of inter-country comparisons of growth rates 5
  (ii) Differences between NMP and GDP growth rates 7
  (iii) Trends and relative levels of aggregate and per capita output 8
  (iv) Trends in aggregate employment and output per worker 10
  (v) Structural changes in output 11
  (vi) " Gross " and " net " industrial and agricultural output 13
  (vii) Trends in the growth rate of output 14
  (viii) " Current " versus " constant " price shares 15
  (ix) Structural changes in employment 16
  (x) Trends in the growth rate of employment 17
  (xi) Output per worker by sector 19
  (xii) Trends in the growth rate of output per man 22
  (xiii) An experiment in comparing economic structures 22

2.2 Projected growth and structure from 1965 to 1980 24
  (i) Analysis of past growth path 24
  (ii) A " first working variant " for 1980 27
  (iii) Projection of the sectoral growth-pattern of output 29
  (iv) Projection of the size and distribution of the labour force 32
  (v) Reconciliation with the output projections 34
  (vi) Alternative projections 36
  (vii) Comparison with previous variants 39
  (viii) Comparison with " official " figures 40
  (ix) A central variant for 1980 41

CHAPTER 3

Growth and structural change in the west 55

3.1 Basic hypotheses and method of approach 55

3.2 A comparative international analysis of manufacturing growth rates 58
  (i) The association between growth rates in manufacturing and levels of income per head 58
  (ii) Output productivity and employment in manufacturing: industrial west 65
  (iii) Illustrative projections to 1980 of manufacturing growth 70

Page

3.3 Growth patterns outside the manufacturing sector 78
  (i) Over-all relationships: manufacturing, non-manufacturing and GDP 78
  (ii) Output and employment trends in individual non-manufacturing sectors (other than agriculture and public services) 86
    (*a*) Mining and quarrying 87
    (*b*) Public utilities (electricity, gas and water) 90
    (*c*) Construction 91
    (*d*) Transport and communications 93
    (*e*) Trade (or distribution) 95
    (*f*) Miscellaneous services 96
  (iii) Growth and structural change in agriculture 97
  (iv) Growth in the public services 111

3.4 Special features of structural development in southern Europe 117

3.5 The output and employment structure of the economy as a whole: trends and projections 121
  (i) Trends in sector shares of output and employment 121
  (ii) Relative output and wages per person employed 123
  (iii) Projections of output and employment for the whole economy to 1980 126

Appendix 3.1 Formalized statement of the relationships between manufacturing growth and GDP growth 137

CHAPTER 4

International comparisons of real incomes, capital formation and consumption 139

  (i) The objectives 139
  (ii) The method 140
  (iii) The results 142

TABLES

Chapter 2 — Growth and structural change in the centrally planned economies

Table
2.1 Estimated growth rates of NMP 1950-1967 by various methods of calculation 6
2.2 Estimates of GDP growth rates 1950-1967 7
2.3 Estimates of GDP, population and GDP per capita, 1950 and 1967 9
2.4 Estimates of employment and of GDP per person employed, 1950 and 1967 10
2.5 Distribution of NMP by sectors of origin, 1950-1967, in terms of 1963 prices 11
2.6 Annual rates of growth of output by sectors, 1950-1967 12
2.7 Growth rates of "net" and "gross" industrial and agricultural output, 1950-1967 13
2.8 Sectoral growth rates of output, "trend" values for 1953 and 1965 15
2.9 Percentage distribution of NMP by sectors of origin, 1950-1967 in terms of current prices 16
2.10 Growth of employment by sectors, 1950-1967 17
2.11 Distribution of employment by sectors, 1950-1967 18
2.12 Sectoral growth rates of employment, "trend" values for 1953 and 1965 20
2.13 Growth of output per man by sectors, 1950-1967 21
2.14 Product per worker by sector, as percentage of the national average, 1950 and 1967 21
2.15 Sectoral growth rates of output per man, "trend" values for 1953 and 1965 22
2.16 "Expected" and actual distribution of labour force by major sectors, 1950 and 1967 26
2.17 "Expected" and actual distribution of GDP by sectors in current and 1963 prices, 1950 and 1967 26

Table Page
2.18 " Expected " and actual relative product per worker by sectors, current and 1963 prices, 1950 and 1967 30
2.19 Sectoral growth pattern of the NMP, " First projection ", 1965-1980 30
2.20 Rates of growth of NMP and of industry and growth ratios, various time intervals 1950-1967 31
2.21 Employment in agriculture in 1965 and projections for 1980 33
2.22 Employment in services (excluding material) 1965 and various projections for 1980 33
2.23 Employment in material sector excluding agriculture, in 1965 and projection for 1980 ... 33
2.24 Projected growth of output, employment and derived productivity 34
2.25 National income less agriculture: five-year moving average of yearly percentage change in output, employment and output per man 36
2.26 Consistency of various employment and productivity estimates 36
2.27 Derivation of new output variants 38
2.28 Various projection variants of sectoral growth patterns of NMP, 1965-1980 38
2.29 Comparisons of planned and projected employment in agriculture and non-agriculture 41
2.30 Estimates of GDP, population and GDP per capita, 1965 and 1980 42
2.31 Growth of GDP and of NMP by sectors 1950-1965 and " Central Projection " for 1980 . 43
2.32 Growth of employment and output per man, by sectors 1950-1965 and " Central Projections " 1965-1980 44
2.33 Distribution of net output and employment and relative output per man, in 1965, and " central projection " 1980 in terms of 1963 prices 45

Appendix table 2.I. Net material product by sectors of origin 1950-1967 46
Appendix table 2.II. Employed persons by main sectors of the economy, 1950-1967 48
Appendix table 2.III. Output per man of net material product by sectors 1950-1967 50
Appendix table 2.IV. Price indices by sector, 1950-1967 52
Appendix table 2.V. " Calculated " per capita GDP and the distribution of employment and GDP in twenty-nine market economies in 1960 54

Chapter 3 — **Growth and structural change in the west**

3.1 Manufacturing growth rates in 1953-1967 related to GDP per head of population in 1953-1955 60
3.2 Productivity and employment in manufacturing as a function of manufacturing output ... 68
3.3 Some factors related to productivity and employment growth in manufacturing 71
3.4 Trends in manufacturing output (per cent a year) 72
3.5 Projections of manufacturing growth rates, 1965-1967 to 1980 76
3.6 Growth rates and elasticities to manufacturing: GDP and non-manufacturing, 1953-1967 . 79
3.7 Elasticity of growth of non-manufacturing sectors on manufacturing growth 1953-1967 81
3.8 Direct estimates of GDP-growth and of growth in non-manufacturing sectors 1953-1967 82
3.9 Analysis of deviations between observed and estimated GDP growth 83
3.10 Employment and productivity growth in manufacturing, non-manufacturing and total economy as a function of output growth: industrial western countries 1953-1967 84
3.11 Employment and productivity as a function of output growth, 1953-1967 86
3.12 Calculated elasticities of sectoral output growth against manufacturing output 1953-1967 . 89
3.13 Mining 90
3.14 Public utilities 91
3.15 Construction 92
3.16 Transport and communications 94
3.17 Trade 95
3.18 Miscellaneous services 96
3.19 Output, employment and output per head in agriculture and in the rest of the economy . 98
3.20 Structural relationships between the agricultural sector and the rest of the economy 99

Table		Page
3.21	Factors determining the agricultural share in total output	102
3.22	Growth rates of gross agricultural production and added value	108
3.23	Regression of added value in agriculture (y) to gross agricultural output (x) (at 1963 market prices) 1957-1965	109
3.24	Shares of the agricultural sector in output and employment in 1965-1967 and projected in 1980	111
3.25	Expected changes in agricultural employment and labour supply for non-agricultural sectors, 1965 to 1980, compared with past changes	112
3.26	Output and employment in public services: shares of total economy and trends	112
3.27	Shares of public service output in GDP (1963 prices) and of public service employment in total employment	114
3.28	Relations between consumption and public service output	115
3.29	Elasticities of growth of public consumption against growth of total GDP (at constant market prices): results of best fitting equations, 1953-1967	115
3.30	Elasticities of civil public service output against GDP less public service output	116
3.31	Actual shares in total economy and residuals from equations relating shares to income levels	123
3.32	Shares of sectors in employment. Actual shares of total employment and residuals from equations relating shares to income levels	124
3.33	Output at current factor cost per person employed, and wage and salary bill per wage and salary earner, by sector, 1963	125
3.34	Elasticities in respect of past and projected growth rates for manufacturing	127
3.35	Projected rates of output growth based on average between national and inter-country elasticities. Past: 1953 to 1967; projections: 1965-1967 to 1980	129
3.36	Productivity and employment projections: industrial countries; 1965-1967 to 1980	132
3.37	Confrontation of labour demand with projected supply: industrial countries, 1965/67 to 1980	133

Chapter 4 — **International comparisons of real incomes, capital formation and consumption**

4.1	Relative real income level in western countries, 1965	142
4.2	Relative levels of consumption and capital formation in western countries, 1965	143
4.3	GDP, consumption and capital formation in western countries in 1965	144
4.4	Relative levels of real income, capital formation and consumption in eastern Europe and Yugoslavia, 1965	144
4.5	Shares of fixed capital formation in eastern Europe and Yugoslavia, 1965	145

Appendix table 4.I. Non-monetary indicators, by country, in 1965 146
Appendix table 4.II. GDP, 1965: Estimating equations 148
Appendix table 4.III. Capital formation, 1965: Estimating equations 148
Appendix table 4.IV. Consumption, 1965: Estimating equations 149
Appendix table 4.V. Per capita gross domestic product, 1965 150
Appendix table 4.VI. Per capita gross domestic fixed capital formation, 1965 151
Appendix table 4.VII. Per capita total consumption, 1965 152

CHARTS

Chapter 2

Chart		
2.1	Growth rates of " net " and " gross " industrial and agricultural output 1950-1967 in relation to per capita GDP in 1950	14
2.2	Estimated production and employment shares as a function of per capita GDP in 1960	23
2.3	Annual percentage growth of NMP	25

Chapter 3

Chart *Page*

3.1 Manufacturing growth rate 1953-1967 as a function of the level of GDP/head 1953-1955 62
3.2 Output, productivity and employment growth 1953-1967 in manufacturing 66
3.3 Volume growth rate in manufacturing output 1953-1968 and projection 73
3.4 Productivity and employment estimated as a function of output 85
3.5 Output growth in selected sectors compared with output growth in manufacturing, 1953-1967 88
3.6 Share of agriculture in total employment compared with share of agriculture in total output 104
3.7 Share of agriculture in GDP compared with level of GDP per head 106
3.8 Non-agricultural content of food expenditure 107

EXPLANATORY NOTES

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the secretariat of the United Nations concerning the legal status of any country or territory or of its authorities, or concerning the delimitation of the frontiers of any country or territory.

The following symbols have been used throughout this SURVEY:

.. = not available or not pertinent;

— = nil or negligible;

* = estimate by the secretariat of the Economic Commission for Europe.

In referring to combinations of years, the use of an oblique stroke—e.g. 1969/70 signifies a twelve-month period (say from 1 July 1969 to 30 June 1970). The use of a hyphen—e.g. 1968-1970—normally signifies either an average of, or a total for, the full period of calendar years covered (including the end years indicated).

Unless the contrary is stated, the standard unit of weight used throughout is the metric ton. The definition " billion " used throughout is one thousand million. Minor discrepancies in totals and percentages are due to rounding.

References in tables or charts to the OECD (Organisation for Economic Co-operation and Development) refer to the west European members of that organization (i.e. excluding Canada, the United States and Japan) unless otherwise stated.

Chapter 1

INTRODUCTION

This study is concerned with the formulation of certain comparisons and generalizations about patterns of economic growth in Europe.[1] It is a contribution to the continuing study of long-term trends in European economic development initiated by the Economic Commission for Europe. It is hoped to pursue these studies, in greater depth, in future publications.

The conclusions set out in this report rest largely upon cross-country analysis of structural development, rather than upon intensive study of each individual economy. The approach implies a presumption that there exist certain common patterns of growth towards which the growth patterns of individual countries tend to converge. Such common patterns may be found in all European countries, or may be confined to groups of countries which share certain basic characteristics such as their level of development or their economic and social systems. Hence, although an effort can be made to find certain basic uniformities among all European countries (and this can be extended to industrialized countries outside Europe), it has generally been found more convenient to consider separately three major groups: the market economies of industrial western Europe, the less industrialized market economies of southern Europe and the centrally planned economies of eastern Europe and the Soviet Union.[2]

Thus somewhat different approaches have been adopted towards the analysis of structural change in eastern and in western Europe (and, in certain respects, within western Europe, in the industrial and southern countries). Yet it will be evident that some fundamental elements in the changing economic structures which are analysed here are common to all countries where a solid industrial base has been established. We may instance the general tendency, to which some attention is paid here, for rates of economic growth to be slower in countries at more advanced levels of economic development, or maturity. Among the many reasons suggested in the literature, one is the nature of technical progress: opportunities for increasing output through improved technology—which can be taken to include improved methods of organization in the widest sense, as well as technical innovation—must tend to diminish, although they certainly do not disappear, as the level of economic maturity rises. This is because of the greater opportunities for assimilation of existing technology open to the less advanced. Moreover, the possibilities of using advanced technology depend largely on opportunities to realize economies of scale; and in practice the opportunities are related to the level of maturity. Again, the stimulus to economic and technical progress afforded by foreign trade is likely to be most effective in the less advanced countries (provided that they are in a position to allow the stimulus to operate). These elements in the process of structural change are common to societies which have already passed a certain threshold; beyond it, the ability to absorb and apply improved technologies and methods of organization can operate with, at first, gathering force.

Again, statistical observations, in both east and west Europe (of which some are reported here) support the view that fast long-term rates of output growth breed fast rates of productivity growth. But economies of scale may not be realized without, at the same time, an increasing input of labour. Thus the supply of labour available to industries with the greatest potential for expansion may exercise a significant constraint on growth. In countries which are industrializing, a main source of extra labour supply for expanding sectors is the "reserve" of under-utilized labour, particularly in agriculture. With increasing economic maturity there is a general tendency for this reserve of labour to become exhausted as levels of income, and productivity, between agriculture and other sectors become more equal.

* * *

One purpose of the study is to provide a general background for considering some aspects of the possible rates and patterns of economic development during the coming 10 to 15 years. It is hoped that this may be of some use to those concerned with development policy in individual countries and with the international economic environment which is playing an increasingly important role in all planning for the future. Thus the study contains tentative economic projections for the years up to 1980 flowing from the historical analysis of the 1950s and 1960s.

---

[1] For an earlier analysis by the ECE, see "Some Factors in Economic Growth in Europe during the 1950s" (published in 1964 as Part 2 of the *Economic Survey of Europe in 1961*).

[2] For brevity, these groups are described as: (1) "industrial western Europe"; (2) "southern Europe" (Greece, Portugal, Spain, Turkey and Yugoslavia); and (3) "eastern Europe" including the Soviet Union. When groups (1) and (2) are treated together, they are described as "western Europe" or the "market economies"; and group (3) is also described as the "centrally planned economies". For several of the analyses, data for the United States, Canada and Japan are also introduced for comparison.

It must be emphasized that these projections are not intended to be " forecasts " in the sense of statements of what are regarded as the most probable future rates or patterns of development. Nor are the projections necessarily identical with the " perspective plans " or projections for comparable periods ahead drawn up, or in course of being elaborated, by national authorities and other experts in several European countries or in international organizations.[3] This is certainly not because the authors of the present study consider that their methods or knowledge—or their intuitions—are likely to be more accurate than the results of the careful work now being done elsewhere. The special feature of the projections made here is that they are built on a foundation of international comparison. The projections are intended simply as illustrations of the consequences of certain conclusions—whose validity as explanations of past development can be judged from the evidence provided in the study—about some aspects of the international pattern of development. It is recognized that they may be invalidated, if taken as probabilistic forecasts, by a variety of factors peculiar to the circumstances of individual countries. It will be seen from the analyses which follow that to every generalization about patterns of international development there are individual exceptions—some within the margin of error of analysis, some the result of statistical incomparabilities, but others clearly significant of special factors determining the recent economic development of the nations concerned. Some of these factors will continue to operate, others will vanish or be replaced by new ones. This limitation on the projections made in the present study must be recognized

The present stage of the study is almost wholly confined to the analysis of trends in output and employment, both in total and by major producing sectors. Trends in the patterns of expenditure have not been studied. The pattern of output does of course reflect changes in patterns of final expenditure, and of the effects of foreign trade, and incorporates also the effects of changes in input-output coefficients for intermediate goods and services.[4] But it embodies these influences only in a composite form, and does not distinguish their relative importance as factors in the rate, or pattern, of growth. Moreover, the methods used depend heavily on extrapolation of past trends in major variables or of the structural relationships between them, as well as on the continuance of certain uniform features that have been found in the international pattern of development.

For these reasons, the study is far from a complete explanation of the reasons why different economies have grown at different rates, or in different patterns. Nor can the projections take much account of efforts that may be made in future to change the rates and patterns of national development in order to solve new problems and to meet new needs.

Analysis of economic growth and development may be attempted from many points of view—historical, sociological or technological. In this study, the approach is rather severely statistical. It may not be necessary to labour the fact that all international comparisons in statistical terms are necessarily imperfect.[5] Macro-economic statistics are not yet always accurate measures of the concepts they purport to describe. And, in spite of the efforts made to improve international statistical standards, comparisons between countries are still made hazardous by differences in the definitions of the concepts measured as well as by differences in the methods of measurement. Where such differences are known to exist, and could affect the conclusions, they are indicated, but many will have been missed.

It is also fully recognized that the concepts which macro-economic statistics attempt to measure have only a restricted significance. Thus the growth of total output or consumption of goods and services at constant prices, per head of population, is not necessarily a measure of increasing welfare. Such measures include many costs of economic development, as well as its benefits. Nevertheless, these concepts and statistics, with all their imperfections, are in fact used as important summary indicators of progress, and as guides to economic policy. They do not meet all the requirements of those who take a broad view of the nature of economic progress or of the objectives of social advance, and may well mislead those who attach excessive importance to them. But they still serve a strategic purpose when their limitations are appreciated.

*
* *

Chapter 2 of the study deals with structural developments in eastern Europe and the Soviet Union. Chapter 3 deals with western Europe; it should be noted that it has, for some purposes, been found desirable to consider southern Europe, within this chapter, as a separate group from the industrial countries, and also that some comparative references are made to the United States, Canada and Japan.

At several points throughout the study, the analysis of economic development rests upon a comparison of the levels of incomes per head in different countries. Such comparisons are necessarily dubious; to avoid excessive reliance upon comparisons based on the simple conversion of national currencies at official exchange rates—which can, in certain cases, be highly misleading—an attempt has been made to develop an alternative, but still highly experimental, method of comparison of income levels which can be used as a basis for certain broad kinds of analysis. This is reported in chapter 4.

---

[3] Comparisons of the present projections with projections by national authorities will be found on pages 40 and 134. For a fuller discussion of methods used in national planning see ECE, *Macro-economic models for planning and policy-making*, United Nations, 1967.

[4] Progress is being made in the comparative analysis of a collection of input-output tables for about 20 European countries, converted with the help of national statistical offices to a uniform classification. Results will be published as soon as possible. It is hoped to use these input-output tables for improvement of the structural analysis.

[5] For example, the growth rates shown for output at constant prices, either historically or as projected, must depend upon the base year used for valuing output at constant prices—a consideration of some importance when either the output structure of the economy or the structure of relative prices is subject to substantial change.

The present study contains little on the part played by foreign trade in structural development. Research on long-term changes in foreign trade patterns and their relation to the development of national economies is in progress in the Secretariat. Some results are reported in " Trade dependence in European countries " in the *Economic Bulletin for Europe*, vol. 21, No. 1.

It may be convenient to summarize here for easy reference the quantitative projections of output growth which emerge from the study (see the table below). The qualifications attached to them have been briefly indicated above; the meaning of the projections can be understood only in the light of the subsequent discussion of the methods used to arrive at them.

Summary of past and projected growth rates

	Annual percentage growth rates (1963 prices)			
	Industry [a]		*Gross domestic product* [b]	
	1950 to 1967	*1965 to 1980*	*1950 to 1967*	*1965 to 1980*
Centrally planned economies				
Bulgaria	13.4	8.5	7.4	6.5
Czechoslovakia	7.2	5.9	5.2	4.9
Eastern Germany	7.5	5.9	5.5	4.9
Hungary	8.4	6.2	4.9	5.0
Poland	9.4	7.6	6.1	6.1
Romania	13.7	8.9	7.7	7.1
Soviet Union	10.5	7.4	7.6	6.1
Total centrally planned economies [c]	9.9	7.3	7.0	6.0

	Manufacturing		*Gross domestic product*	
	1953 to 1967	*1965-1967 to 1980*	*1953 to 1967*	*1965-1967 to 1980*
Market economies				
Industrial west				
Austria	6.0	5.0	5.1	4.7
Belgium	5.3	5.2	3.7	4.2
Denmark	5.6	5.1	4.4	4.3
Finland	6.0	5.6	4.8	4.7
France [d]	5.5	5.2	4.9	4.6
Western Germany	6.8	5.2	5.5	4.6
Ireland	5.1	6.3	2.5	4.9
Italy	8.0	6.9	5.3	5.3
Netherlands	5.9 [e]	5.6	4.8	4.6
Norway	4.8	5.0	4.1	4.5
Sweden	6.0	5.1	4.2	4.2
United Kingdom	3.2	4.0	2.8	3.6
Total industrial west [c,f]	5.6	5.2	4.5	4.5
Southern Europe				
Greece	8.0	9.5	5.8	6.9
Portugal	8.2	8.5	5.1	6.5
Spain	8.7	8.5	5.9	6.3
Yugoslavia	11.7	10.0	8.3 [g]	7.8 [g]
Total southern Europe [c,h]	9.3	9.1	6.3	6.8
Total market economies [c,f,h]	5.8	5.6	4.6	4.7

Sources: Centrally planned economies, chapter 2, tables 2.6 and 2.31. Market economies, chapter 3, tables 3.1, 3.8 and 3.35.

[a] Mining; manufacturing; gas, water, electricity. Net output.

[b] The corresponding figures for *net material product* are:

	1950 to 1967	*1965 to 1980*
Bulgaria	8.0	6.7
Czechoslovakia	5.2	5.3
Eastern Germany	6.1	5.4
Hungary	5.8	5.4
Poland	6.7	6.3
Romania	8.3	7.3
Soviet Union	8.2	6.4
TOTAL	7.6	6.3

[c] 1963 output values for individual countries extrapolated by trend growth rates and aggregated.

[d] France: based on national accounts series before 1968 revision, and on SNA concept.

[e] Netherlands: the corrected figure is 6.3 (see table 3.1 (chapter 3), footnote *e*).

[f] Switzerland excluded.

[g] Yugoslavia: gross material product.

[h] Turkey excluded.

Chapter 2

GROWTH AND STRUCTURAL CHANGE IN THE CENTRALLY PLANNED ECONOMIES

2.1 TRENDS IN OUTPUT, EMPLOYMENT AND OUTPUT PER MAN—1950-1967

(i) Problems of inter-country comparisons of growth rates [1]

Any index purporting to measure output growth over a relatively long period of time can only have an approximate meaning and this is true even more where growth has been rapid and characterized by profound structural changes. Moreover, in the centrally planned economies, internal price relations have tended to change rather abruptly so that the use of two—even not too distant—base years may yield significantly different growth estimates. These as well as other factors tend to complicate the inevitably difficult problem of growth measurement in these countries.[2]

In addition to the problems just mentioned there are a number of other difficulties in any inter-country comparative study of time trends. Even within the group of centrally planned economies the comparability of available growth indices is affected by such factors as differences in the definition of production,[3] the practice of price fixing (varying incidence of turnover taxes, capital charges and profits for different commodities and sectors) or the treatment of various balancing items, particularly those arising in connexion with the dual price system prevailing in foreign trade accounting. Other important elements are differences in the frequency with which the index bases were changed,[4] and in the practice concerning revision of the aggregate in the light of subsequently adopted sectoral weights.[5]

Yet for a study such as the present one, which is essentially comparative, it is necessary to base the analysis on indices which are, so far as practicable, comparable in order to provide a common standard of reference. For this reason, indices have been constructed for each country by reweighting the existing national indices of growth of the major sectors (industry, agriculture, etc.) by means of the 1963 inter-sectoral price structure.[6] Growth rates computed on the basis of these official and reweighted indices are shown separately in the two parts of table 2.1.[7] None of these sets of figures is inherently superior as a measure of past growth performance, although, as already mentioned, from the point of view of international comparability the reweighted figures may well have a certain advantage.

---

[1] The historical period covered in this chapter is somewhat longer than that for the European market economies (chapter 3). It includes the years from 1950 to 1967 instead of 1953 to 1967. With the inclusion of the years from 1950 to 1952, two full phases of post-war economic development are encompassed, as is shown later. An exception is made for eastern Germany, where the post-war development period began around 1952 and hence 1952 is generally used as the base year. For Bulgaria the period covered is also 1952 to 1967, because of insufficient data for the earlier years.

[2] Some problems, such as those posed by the appearance of new products, changes in the quality of old products, disguised price movements, etc., appear in any calculation of output indices. In the centrally planned economies, output indices are generally used not only as a statistical measure but largely as plan indicators and success criteria as well. Problems of measurement which arise in this connexion were dealt with in the *Economic Survey of Europe in 1962*, Part 2, " Economic Planning in Europe ", chapter II.

[3] The most important differences arise in connexion with the treatment of non-material services rendered by the transport and communications sector; Hungary since 1958 and Poland since 1960 include such services in the " boundary of production ", while other countries exclude them.

[4] Thus in Hungary, for instance, there was a shift in the index base in 1949, 1954 and 1959. In Romania, on the other hand, the index for the period 1950-1965 is estimated by linking two parts, one for the period 1950-1959 based on 1950 prices, the other for the period 1959-1965 based on 1955 prices. Starting with 1965, a 1963-based index is used. It is a usual statistical experience that indices of output volume based on recent weights tend to show smaller increases than those with a more distant weight-base. In this particular instance the increases in the official Hungarian index has evidently a downward bias in relation to the Romanian and some other national indices of the area.

[5] Again, taking Hungary as an example, the index mentioned in the preceding footnote was subsequently revised by recomputing the 1950-1959 part on the basis of the 1959 sectoral weights and taking the average of the original and recomputed indices.

Differences exist not only between countries but also in the treatment of estimates for various periods in the process of linking them together into a single index. For instance, the officially reported index of NMP growth in Poland for the period 1950-1965 consists of three parts linked together by varying methods. Thus the originally computed index for the period 1955-1960 (in 1956 prices) was linked with the index for the years 1960-1965 (in 1961 prices) without recomputing the aggregate index on the basis of the new weights attached to the component indices. However, the index originally calculated for the period 1949-1955 (in 1950 prices) was linked with the index for the following years after recomputing the aggregate index in terms of the new weights attached to the components of expenditure. Since the change of weights was almost twice as high for consumer goods as for investment goods, and since consumption grew in this period at a much lower rate than accumulation, this resulted in a considerable lowering of the aggregate index.

[6] The same procedures have been applied to the output indices for the market economies.

In columns 1 to 4 of both parts of the same table, growth rates obtained from the same basic data—but differing in the methods of calculation—are presented. Each of these methods has its own application and, although subject to different algebraic restraints, has at different times been used to provide a measurement of historical " trends ". It is, of course, well-known that measured growth may differ in accordance with the algebraic formula used for calculation. The important thing here is to test the extent to which differences in calculation technique influence the different results. Such differences indicate—among other things—how smooth the growth path has been.

The result of all this is a wide spectrum of rates, once more a reminder of the tentative nature of any growth measure.[8] The data suggest that measurable

---

[7] For the official and reweighted indices, see Appendix table 2.I.

[8] Thus, in what is a rather extreme case, in Romania the growth of the NMP shows a range of between 7.4 and 10.1 per cent depending on which panel or column is chosen. But even in Poland — for which differences between the rates are relatively the smallest—a range of between 6.5 and 7.1 per cent is indicated.

TABLE 2.1

Estimated growth rates of NMP 1950-1967 by various methods of calculation

	Panel A (official indices)				*Panel B (re-weighted indices)*			
Country	G1	G2	G3	G4	G1	G2	G3	G4
Bulgaria	8.5[a]	8.7	8.2	8.3	8.0	8.3	7.7	7.8
Czechoslovakia	6.0	6.1	5.7	5.4	5.2	5.2	4.9	4.8
Eastern Germany	5.7[a]	5.7	5.6	5.5	6.1	6.1	6.0	5.8
Hungary	5.8	6.0	5.5	5.6	5.8	6.1	5.5	5.6
Poland	7.0	7.1	6.9	6.7	6.7	6.7	6.6	6.5
Romania	9.7	10.1	9.0	8.9	8.3	8.9	7.4	7.5
Soviet Union	8.9	9.0	8.7	8.4	8.2	8.2	8.1	7.9

Sources: official and re-weighted indices as obtained from officially reported sectoral indices in constant prices and the share of these sectors in total net output in terms of 1963 prices. Official data on the distribution of net output in 1963 by broad sectors are available in the national yearbooks for that year. Sectoral indices of net output covering the whole period were compiled from various official sources and in some cases from indirect data. Among the more important estimates prepared by the secretariat are these for eastern Germany 1952-1954 and 1956-1959, and for the Soviet Union 1950 to 1958.

[a] 1952-1967.

The methods of calculation of growth rates are as follows:

Geometric average growth rate

$$G_1 = (b - 1) \cdot 100 \text{ where}$$

$$b = \sqrt[n-1]{\frac{Y_n}{Y1}}$$

and Y_n and $Y1$ refer to output in the last and in the first years respectively of the period studied.

Arithmetic average growth rate

$$G_2 = (b - 1) \cdot 100 \text{ where}$$

$$b = \frac{1}{n-1} \sum_{t-1}^{n} \frac{Y_t}{Y_{t-1}}$$

and Y_t refers to output in the successive intermediate years (t)

Least square exponential rate

$$G_3 = (b-1) \cdot 100 \text{ where}$$

$$b = \sqrt[t-1]{\frac{Y'_t}{a'}}$$

in which b is estimated as:

$$\log b = \frac{\sum_{t = \frac{n-1}{2}}^{+\frac{n-1}{2}} t \log Y}{t^2}$$

and a' is estimated as:

$$\log a' = \frac{\sum_{1}^{n} \log Y}{n}$$

and Y' refers to the estimated output in the year (t) and a' to the estimated output in the base year.

" Glover " exponential rate

$$G_4 = (b-1) \cdot 100 \text{ where}$$

$$b = \sqrt[t-1]{\frac{Y''_t}{a''}}$$

and b is calculated according to the expression

$$\frac{n}{1-b^{-n}} = \frac{1}{1-b^{-1}} = \frac{\sum_{t-o}^{n-1} Y_t t}{\sum_{t-o}^{n-1} Y_t} = M \text{ and}$$

$$a'' = \frac{b-(n-M)(b-1)}{n} \sum_{t-o}^{n-1} Y_t$$

and the notations " Y " and " a " are as above, and the value of b corresponding to M can be read from available tables running from $n = 2$ to $n = 40$. The tables (and formula), developed by James W. Glover, can be found in *Tables of Applied Mathematics in Finance Insurance Statistics*, Ann Arbor, Michigan, pp. 470 ff.

An analysis of the advantages and shortcomings of each of these methods can be found in B. P. Pesek " Economic Growth and its Measurement ", *Economic Development and Cultural Change*, vol. IX, No. 3, University of Chicago Press, April 1961.

growth during the period considered was very sensitive to even the slightest re-weighting procedures.[9]

This sensitivity is of importance if one considers that, in projecting aggregate output on the basis of a sectoral breakdown, a recent weights pattern must be relied on. And, since such patterns have in the past produced a lower growth rate than officially reported, a certain deceleration in the projected rate is bound to appear even if one is to assume that sectoral growth rates will remain unchanged. The computed growth rates were also, in certain cases, sensitive to variation in the technique of computation. The degree of sensitivity is of importance in that it helps to illustrate the differences which may appear if—in selecting a trend figure for projection—one or other of the indicated techniques is used.[10]

(ii) Differences between NMP and GDP growth rates

In order to improve somewhat the comparability of the available growth indices for the centrally planned economies with those for other countries, an attempt is made to allow for the exclusion of depreciation and services from the officially reported indices pertaining to the net material product (NMP). The conversion from the NMP to the GDP concept is carried out in two steps. First, an allowance for depreciation is added to derive what may be termed a gross material product (GMP) aggregate.[11] Second, GDP figures for 1963 are derived by adding the value of output of the non-material service sector, which is assumed to be equal to the proportion of the labour force in this sector adjusted by a coefficient reflecting a " normal " relative level of product per worker in the service sector with respect to the national product per worker at a given GDP per capita level. (See page 22 below.)

Changes over time in the output of the service sector were estimated on the assumption that the growth rate of productivity of labour in the service sector amounted to one per cent per annum on the basis of statistics for western countries as provided in chapter 3.[12]

A number of alternative measures were presented so as to illustrate the range within which " historical " rates may be found on the basis of the available indices of production, both total and by major sectors. In the following, the figures in column 1 of the second part of table 2.1 are utilized as the " central measure " of the average growth rate of NMP in the period 1950-1967. One reason for this choice, as well as the considerations already mentioned, is that these figures are more comparable to the indices which will be utilized at a later stage to follow up changes in the direction of movement in the trend line within the period investigated.[13]

The relevant figures are shown in table 2.2. The data suggest, first, that a change from " net " to " gross " material product concept has no significant impact on the growth measure. Second, the growth of the service sector must have varied very significantly (owing to differences in employment growth) from one country to another, the variation probably being greater than in the case of commodity producing sectors. The weight

Table 2.2

Estimates of GDP growth rates 1950-1967

	Average annual compound growth rate						
				Non-material services			
Country	*NMP*	*Depreciation*	*GMP*	*Employment*	*Output*	*GDP*	*Estimated proportion of services in GDP in 1963 per cent*
Bulgaria [a]	8.0	11.8	8.2	3.1	4.1	7.4	16.1
Czechoslovakia	5.2	5.4	5.2	3.9	4.9	5.2	17.9
Eastern Germany [a]	6.1	5.8	6.0	2.6	3.6	5.5	19.4
Hungary	5.8	6.1	5.8	1.3	2.3	4.9	20.9
Poland	6.7	4.8	6.5	3.7	4.7	6.1	16.9
Romania	8.3	7.7	8.3	3.9	4.9	7.7	12.5
Soviet Union	8.2	9.9	8.3	4.2	5.2	7.6	19.6

[a] 1952-1967.

---

[9] As would be expected, the effect of re-weighting generally is to reduce the recorded growth rate. This is largely due to the fact that agricultural output has tended to grow at a lower rate than the output of other sectors, and that the relative valuation of this sector tends to be higher the more recent the period taken as a basis for valuation. Eastern Germany is the only country for which the re-weighted index is higher than the official one. This is because the official index is weighted here in terms of 1967 prices, i.e. in prices of a later year than the re-weighted index.

[10] It must be noted here that calculation procedures designed to yield the " best " measure of past growth may not be those best suited for extrapolation purposes.

[11] The value of depreciation allowance was estimated from the value of gross fixed assets by sectors, using the following coefficients: industry and trade 4.0 per cent, construction 8.0 per cent, agriculture 3.3 per cent, transport and communications 2.5 per cent.

[12] See tables 3.14 and 3.22. In selecting an average growth rate of one per cent allowance was made for the fact that the data for the western countries include in principle the imputed value of owner-occupied dwellings. See also A. T. P. Hill and J. Mc Gibbon in *Growth of sector real products, Review of income and wealth*, Series 12, No. 1, March 1966.

[13] This is because indices are used calculated by the G_1 method, which, as can be seen from table 2.1, are in most cases nearest to those obtained by the G_2 method. Changes in the trend line are followed later on by means of five-year moving average growth rates calculated by the G_2 method.

which the service sector assumes in the economy of the various countries (column 8) must also have varied. A change from the " gross material " to the gross domestic product concept has generally tended to lower the growth index.[14]

(iii) Trends and relative levels of aggregate and per capita output

It is difficult to conceive a comparative study of long-term trends in economic development with emphasis on future prospects without some approximate estimates of the level of income already achieved by the countries under consideration. Moreover, projection techniques often consist in extrapolating interrelations found, on the basis of international comparative analysis, between the level of development reached as measured by per capita income and various dependent variables. And although one must proceed cautiously when " extrapolating " future developments in the centrally planned economies on the basis of interrelationships found in market economies, it is felt that there are areas where such a technique provides a useful insight with regard to future trends.

The problems which arise in trying to compare per capita incomes, even for countries with similar economic systems, are numerous and well-known. Most important here are those which arise from differing internal price and production structures and from differences between official exchange rates and relative purchasing power of the various national currencies; such difficulties are greatly magnified in east-west comparisons. Moreover, the currently used concepts of aggregate economic activity in east and west (NMP and GDP respectively) are not comparable, requiring adjustments which, at least as far as the estimation of levels is concerned, are subject to a rather wide margin of error.

Internationally comparable indicators of economic activity in 1963 were estimated by following a method developed by the Institute of Economic Planning in Hungary.[15] A detailed description of the method and some analysis of the results relating to the year 1965 are given in chapter 4. In the current chapter, in addition to the 1965 figures, estimates obtained by a similar approach for the year 1960 have also been utilized. In order to obtain data pertaining to 1963—a year which serves as a basis for valuation in both chapter 2 and chapter 3—the estimates for 1960 and 1965 were extrapolated (forwards and backwards, respectively) by means of the estimated per capita GDP growth index. The resulting 1963 estimates in terms of 1960 and 1965 prices were adjusted to correspond to average 1963 prices, and the two sets of figures were averaged.

In order to facilitate a better appraisal of what the selected average growth rates (of GDP in the period 1950-1967: see table 2.2, column 6) represent in terms of absolute changes in GDP, its distribution by countries, and absolute and relative changes in per capita GDP, they are combined with the calculated figures of per capita GDP in 1967 in " average " 1963 prices expressed in dollars.[16] The relevant data are shown in table 2.3. In the seventeen year period, the GDP of the area rose from approximately 115 billion dollars to some 370 billion, an annual average rate of increase of 7.0 per cent. The growth of the GDP of the Soviet Union was markedly faster (an annual average rate of 7.6 per cent) than the growth of GDP of the east European countries taken as a group (estimated here to have been a rate of 5.9 per cent). As a result of the more rapid expansion, the Soviet Union's share of the GDP of the area rose from some 65 per cent in 1950 to 71 per cent in 1967.

Among the east European countries, Romania and Bulgaria enjoyed very high growth rates, 7.7 and 7.4 per cent respectively. Poland was next with an average growth rate of some 6.1 per cent, followed by eastern Germany (some 5.5 per cent) and Czechoslovakia (5.1 per cent). The relatively slowest growth was in Hungary with a rate of 4.9 per cent, this being partly the result of the inclusion in the estimate of the years 1954 and 1956 which were characterized by sharp decreases in production due to special developments.

A salient feature of the figures presented is the implied negative association between growth rates and per capita GDP levels at the beginning of the period observed. Only Hungary deviated to a significant extent from this pattern, ranking considerably lower in its growth rate than would be expected from its relative per capita GDP level.

Since the population increased at an annual rate of 1.3 per cent, the growth of per capita GDP in the area as a whole is estimated to have been 5.6 per cent per annum. Although the growth of the population in the Soviet Union was almost twice as fast as that in eastern Europe, the higher GDP growth rate was sufficient to assure a higher per capita growth. Thus, according to the estimates, per capita GDP in the Soviet Union rose at a rate of 5.9 per cent as compared with a rate of 5.1 per cent in eastern Europe. In absolute terms this meant an increase for the Soviet Union from around 420 to 1,100 " average " dollars per head, valued at 1963 prices. For eastern Europe, the corresponding increase was from some 460 to around 1,070 dollars.

Relative population growth rates in the east European countries were such that the pattern of relative per capita GDP growth rates differed somewhat from the pattern of GDP growth rates. Romania and Bulgaria raised their per capita GDP levels at a rate of some 6.5 per cent—significantly reducing the gap in relation to the other countries. But Poland, on the other hand, succeeded in increasing its per capita product only somewhat faster than Czechoslovakia, while eastern Germany—

---

[14] This is an experience which is shared in general also by market economies cf. A. T. P. Hill and J. McGibbon, *op. cit.*

[15] Some results of this work were published in English by E. Ehrlich in *Acta Oeconomica*, Tomus 2, Fasc. 1-2, Budapest 1967, and in *Czechoslovak Economic Papers*, No. 7, Prague 1966.

[16] The 1963 estimates obtained by the method described above were up-dated to 1967 by application of estimated GDP per capita growth indices over the four years in question.

Table 2.3

Estimates of GDP, population and GDP per capita, 1950 and 1967

GDP

Country	In billions of dollars 1963 " average " prices		Percentage distribution		Average annual growth rates per cent
	1950	1967	1950	1967	
Bulgaria	2.26	7.62	2.0	2.1	7.4
Czechoslovakia	8.65	20.33	7.5	5.5	5.2
Eastern Germany	10.17	25.21	8.8	6.9	5.5
Hungary	4.44	10.07	3.8	2.7	4.9
Poland	11.14	30.70	9.6	8.3	6.1
Romania	3.96	13.94	3.4	3.8	7.7
Total eastern Europe	40.62	107.87	35.1	29.3	5.9
Soviet Union	75.08	260.05	64.9	70.7	7.6
Eastern Europe and Soviet Union	115.70	367.92	100.0	100.0	7.0

Population

Country	In millions		Percentage distribution		Average annual growth rates per cent
	1950	1967	1950	1967	
Bulgaria	7.25	8.31	2.7	2.5	0.80
Czechoslovakia	12.39	14.31	4.6	4.3	0.84
Eastern Germany	18.39	17.08	6.8	5.1	—0.43
Hungary	9.34	10.23	3.5	3.0	0.54
Poland	24.82	31.94	9.2	9.5	1.49
Romania	16.31	19.29	6.1	5.7	1.00
Total eastern Europe	88.50	101.16	32.9	30.0	0.79
Soviet Union	180.05	235.55	67.1	70.0	1.59
Eastern Europe and Soviet Union	268.55	336.71	100.0	100.0	1.34

Per capita GDP

Country	In dollars 1963 " average " prices		Average of region = 100		Average annual growth rates per cent[a]
	1950	1967	1950	1967	
Bulgaria	312	917	72	84	6.5
Czechoslovakia	698	1 421	162	130	4.3
Eastern Germany	553	1 476	128	135	6.0
Hungary	475	984	110	90	4.4
Poland	449	961	104	88	4.6
Romania	243	723	56	66	6.6
Total eastern Europe	459	1 066	107	98	5.1
Soviet Union	417	1 104	97	101	5.9
Eastern Europe and Soviet Union	431	1 093	100	100	5.6

Note. — GDP estimates for 1950 were obtained on the basis of the 1967 figures and growth rates indicated in the table. For a description of the method of derivation of the basic figures and growth rates, see text.

[a] Geometric rate.

owing to a decline in population—raised its per capita product as fast as the Soviet Union.

(iv) Trends in aggregate employment and output per worker

Between 1950 and 1967 the labour force in the centrally planned economies rose by some 40 million, equivalent to a compound growth rate of 1.7 per cent per year (see table 2.4).[17] The increase in employment was thus faster than that of the population which, as already mentioned, grew at an annual rate of 1.3 per cent. A higher growth rate of the labour force than of population was characteristic of most countries, the growth of the labour force being slower than that of the population only in Bulgaria.

While there have been exceptions, growth rates of population and employment were generally interrelated: countries with a higher rate of population growth tended to have a higher growth rate of employment. In the Soviet Union employment grew by about 2 per cent per year as compared with 1 per cent in eastern Europe. Within the east European countries the range of variation in the rate of employment growth was rather wide: from 0.4 per cent in eastern Germany to some 1.8 per cent in Poland. As in the case of population growth, little association can be found between growth rates of employment and relative per capita GDP levels.

---

[17] It must be noted that the employment figures given in the table differ somewhat from the figures published in the *Economic Survey of Europe in 1968*, chapter III, table 8, relating to "active population".

Employment aggregates as a rule exclude, and "active population" figures include "Armed Forces", some categories of "unpaid family workers" or persons seeking employment, and other marginal groups. Moreover, employment figures are generally adjusted to a full time basis although the methods by which these adjustments are made differ from country to country, particularly with respect to the agricultural labour force.

In compiling employment figures, total and by sectors, resort had to be made to indirect data in a number of cases. Rather involved procedures were used to derive the total employment figures for the Soviet Union. Estimation procedures of various types were also used to derive the figures for agricultural employment in Bulgaria, Poland and Romania. Partly because of this and partly because of inherent statistical difficulties, data on employment in agriculture are less reliable than those for other sectors. For total and sectoral employment indices, see Appendix table 2.II.

TABLE 2.4

Estimates of employment and of GDP per person employed, 1950 and 1967

Employment total

Country	*In millions* 1950	1967	*Percentage distribution* 1950	1967	*Average annual growth rate*[a] *per cent*
Bulgaria	3.98	4.32	3.3	2.7	0.5
Czechoslovakia	5.58	6.69	4.7	4.2	1.1
Eastern Germany	7.58	8.16	6.3	5.1	0.4
Hungary	4.24	5.01	3.5	3.2	1.0
Poland	11.88	16.16	9.9	10.1	1.8
Romania	8.33	9.83	6.9	6.2	1.0
Total eastern Europe	41.59	50.17	34.7	31.5	1.1
Soviet Union	78.30	109.34	65.3	68.5	2.0
Eastern Europe and Soviet Union	119.89	159.51	100.0	100.0	1.7

GDP per employed person

Country	*In dollars 1963 "average" prices* 1950	1967	*Average of the region = 100* 1950	1967	*Average annual growth rate*[a] *per cent*
Bulgaria	568	1 766	59	77	6.9
Czechoslovakia	1 551	3 040	161	132	4.0
Eastern Germany	1 341	3 089	139	134	5.0
Hungary	1 047	2 008	109	87	3.9
Poland	938	1 900	97	82	4.2
Romania	476	1 419	49	62	6.6
Total eastern Europe	977	2 150	101	93	4.8
Soviet Union	959	2 378	99	103	5.5
Eastern Europe and Soviet Union	965	2 307	100	100	5.3

[a] Geometric rate.

Although the rise in the labour force was rather steep in most countries, the greater part of the GDP growth can be attributed to higher output per man. However, as can be seen from table 2.4, differences between countries in the growth rate of output per man were rather large, and while these have generally tended to narrow the existing differences in productivity levels (output per man generally rising faster in countries with relatively lower per capita GDP levels), the spread in the latter has remained greater than that in per capita GDP levels.

In all countries, employment in the material sectors grew less than total employment. Since the growth of NMP has exceeded the growth of the GDP, differences between the growth rate of " over-all productivity " and of productivity in the material sector have been very considerable, as shown by the following figures:

Annual (geometric) rates of growth of NMP per person employed, in material sectors, 1950 to 1967

(Percentages)

Country	*NMP*		*Employment in material sectors*	*NMP per employed person*		*GDP per employed person*[a]
	Official	*Re-weighted*		*Official*	*Re-weighted*	
Bulgaria	8.5[b]	8.0[b]	0.2[b]	8.3[b]	7.8[b]	6.9
Czechoslovakia	6.0	5.2	0.6	5.4	4.6	4.0
Eastern Germany	5.7[b]	6.1[b]	—0.1[b]	5.8[b]	6.2[b]	5.0
Hungary	5.8	5.8	0.9	4.9	4.9	3.9
Poland	7.0	6.7	1.6	5.3	5.0	4.2
Romania	9.7	8.3	0.7	8.9	7.5	6.6
Soviet Union	8.9	8.2	1.6	7.2	6.5	5.5

[a] Comparable to previous column.

[b] 1952-1967.

(v) Structural changes in output

Economic growth is associated with structural changes and among these the most conspicuous—at least within the intervals of changes in per capita income relevant here—are shifts in the relative importance of sectors such as industry, agriculture, etc. In the centrally planned economies, rapid industrial growth has been a primary objective of economic policy. The results are evident in the marked increases of the share of industry and the declines of the share of agriculture in the NMP shown in table 2.5. These shifts were more pronounced in the industrially less developed than in the more developed countries of the region, with the result that the sectoral structure of production has become much more similar among the countries of the group than it was in the early post-war period.

The sectoral growth pattern which brought about these changes in structures is shown in table 2.6. The table, in addition to providing the growth rates of output corresponding in coverage and sectoral breakdown to the NMP concept, includes estimates of output growth by sectors corresponding to the GDP coverage, i.e. including depreciation and services. Several findings are suggested.

As with total NMP, inclusion of depreciation has little effect on the estimated growth rate of the various sectors. An exception is the transport and communications sector where (owing to a considerably slower growth of capital than of output) the inclusion of depreciation tends to lower significantly the recorded growth rate. For some countries inclusion of depreciation also affects the agricultural growth rate, but in the opposite direction to that for the transport and communications sector.

TABLE 2.5

Distribution of NMP by sectors of origin, 1950-1967, in terms of 1963 prices

(Percentages)

Country and sector	*1950*	*1953*	*1955*	*1958*	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*
Bulgaria	*a*											
1. Industry	23.7	21.1	27.6	43.7	41.5	43.7	43.5	44.8	45.6	47.0	47.4	49.2
2. Construction	6.2	6.1	6.7	6.1	6.9	7.1	7.1	7.0	7.0	7.3	7.6	8.1
3. Agriculture	52.0	54.9	49.1	42.5	37.9	35.0	34.1	33.3	33.4	30.6	31.0	28.3
4. Other	18.1	18.0	16.6	14.9	13.7	14.2	15.2	14.9	13.9	15.0	14.0	14.4
Czechoslovakia												
1. Industry	48.5	53.1	54.0	58.8	62.4	64.2	67.3	66.8	67.3	68.8	67.9	67.3
2. Construction	5.2	7.9	8.2	8.9	10.3	10.1	9.5	8.1	9.1	10.0	10.6	11.2
3. Agriculture	34.3	27.0	23.5	19.5	15.9	14.6	12.0	14.0	13.3	11.1	11.7	11.1
4. Other	12.0	12.0	14.3	12.8	11.4	11.1	11.2	11.1	10.3	10.1	9.8	10.4
Eastern Germany	*a*											
1. Industry	53.6	52.2	59.1	61.5	63.0	65.0	65.2	66.0	65.7	65.4	65.4	65.4
2. Construction	5.1	4.8	4.8	5.2	5.8	5.7	5.8	5.4	5.8	5.9	6.0	6.1
3. Agriculture	20.1	19.0	14.4	13.0	11.5	9.9	9.8	9.7	9.5	9.6	9.6	9.7
4. Other	21.3	24.1	21.7	20.3	19.8	19.4	19.2	18.9	19.1	19.1	19.0	18.8
Hungary												
1. Industry	41.9	49.6	50.4	50.8	54.7	57.5	58.5	59.1	59.8	62.3	63.0	63.3
2. Construction	8.1	9.9	8.2	9.2	10.4	9.9	9.8	9.6	9.5	9.5	9.5	9.9
3. Agriculture	37.5	30.1	31.4	28.1	22.8	20.7	20.0	19.7	19.1	16.7	16.5	15.5
4. Other	12.5	10.5	9.9	11.9	12.1	11.8	11.7	11.6	11.6	11.5	11.1	11.3

TABLE 2.5 (*continued*)

Country and sector	*1950*	*1953*	*1955*	*1958*	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1696*	*1967*
Poland												
1. Industry	34.6	40.8	43.2	44.6	46.6	46.9	50.0	49.8	51.4	52.4	52.5	53.5
2. Construction	7.4	9.8	8.8	9.1	9.2	8.7	9.0	8.9	9.0	8.8	9.0	9.7
3. Agriculture	43.3	34.7	32.6	29.9	26.6	27.1	22.6	23.5	22.1	21.5	21.0	19.6
4. Other	14.7	14.8	15.4	16.4	17.7	17.3	18.4	17.8	17.5	17.3	17.5	17.2
Romania												
1. Industry	23.8	27.4	28.8	38.8	39.4	41.2	45.9	46.9	48.7	51.3	51.7	54.7
2. Construction	4.5	6.4	5.4	7.7	8.5	8.5	8.8	8.3	8.2	7.9	7.8	8.4
3. Agriculture	50.8	47.8	47.8	36.4	37.9	36.0	31.1	29.8	27.9	26.2	27.8	25.7
4. Other	20.9	18.4	18.0	17.1	14.2	14.3	14.2	15.0	15.2	14.6	12.6	11.3
Soviet Union												
1. Industry	39.3	44.2	46.0	46.2	47.9	49.5	51.2	54.2	52.8	54.7	55.2	56.1
2. Construction	8.1	8.6	8.4	9.2	9.7	9.3	9.0	9.0	8.7	8.8	8.6	8.7
3. Agriculture	39.6	32.2	30.4	29.0	25.7	24.7	23.5	20.5	22.4	20.3	20.3	18.9
4. Other	13.0	15.0	15.2	15.6	16.7	16.5	16.3	16.3	16.1	16.3	15.8	16.3

[a] 1952.

TABLE 2.6

Annual rates of growth of output by sectors, 1950-1967

(*Percentages*)

Country and sector	*Net product*		*Value added*
	Exponential growth rate	*Geometric growth rate*	*Geometric growth rate*
Bulgaria [a]			
1. Industry	13.6	13.4	13.4
2. Construction	9.1	9.9	10.1
3. Agriculture	3.3	3.7	3.9
4. Transport and communications	13.4	14.3	12.8
5. Trade and other	3.7	4.4	4.5
6. Material sectors	7.7	8.0	8.2
7. Non-material services	—	—	4.1
8. GDP total	—	—	7.4
Czechoslovakia			
1. Industry	7.0	7.2	7.1
2. Construction	8.2	10.0	9.9
3. Agriculture	−1.8	−1.6	−1.0
4. Transport and communications	8.2	9.0	5.7
5. Trade and other	1.7	2.8	3.1
6. Material sectors	4.9	5.2	5.2
7. Non-material services	—	—	4.9
8. GDP total	—	—	5.2
Eastern Germany [a]			
1. Industry	7.6	7.5	7.3
2. Construction	7.7	7.4	7.6
3. Agriculture	0.6	1.0	1.6
4. Transport and communications	3.5	4.3	4.1
5. Trade and other	5.0	5.5	5.5
6. Material sectors	6.0	6.1	6.0
7. Non-material services	—	—	3.6
8. GDP total	—	—	5.5
Hungary			
1. Industry	7.8	8.4	8.4
2. Construction	6.0	7.0	7.2
3. Agriculture	0.5	0.4	0.8
4. Transport and communications	8.6	9.7	6.3
5. Trade and other	4.3	3.5	3.8
6. Material sectors	5.5	5.8	5.8
7. Non-material services	—	—	2.3
8. GDP total	—	—	4.9
Poland			
1. Industry	9.0	9.4	9.2
2. Construction	7.0	8.4	6.5
3. Agriculture	2.0	1.8	1.8
4. Transport and communications	8.5	8.9	7.1
5. Trade and other	8.0	7.0	7.0
6. Material sectors	6.6	6.7	6.5
7. Non-material services	—	—	4.7
8. GDP total	—	—	6.1
Romania			
1. Industry	13.0	13.7	13.4
2. Construction	11.2	12.3	12.4
3. Agriculture	3.0	4.0	4.0
4. Transport and communications	11.1	12.3	10.8
5. Trade and other	2.3	2.2	2.4
6. Material sectors	7.4	8.3	8.3
7. Non-material services	—	—	4.9
8. GDP total	—	—	7.7
Soviet Union			
1. Industry	10.1	10.5	10.5
2. Construction	8.4	8.7	8.8
3. Agriculture	3.9	3.6	3.7
4. Transport and communications	12.2	11.4	11.0
5. Trade and other	8.1	8.9	8.9
6. Material sectors	8.1	8.2	8.3
7. Non-material services	—	—	5.2
8. GDP total	—	—	7.6

[a] 1952-1967.

The profiles of sectoral growth are characterized by a considerable degree of similarity in the various countries. Industry was, in most cases, the fastest growing sector, construction generally following closely. The ranking of the transport and communications sector was more diverse, although in most cases it was lower than that of construction (at least if depreciation is included). The rates of growth of all three of these sectors usually exceeded that of total output. Agriculture was generally the slowest growing sector; trade and non-material services sharing the fourth and fifth rank in the sectoral growth spectrum.[18]

Thirdly, although all the sectoral growth rates were characterized by a high degree of inter-country variability, it is only for industry and agriculture that a strong association can be found between growth rates and development levels. The negative correlation between the growth of total GDP and the 1950 per capita GDP levels mentioned above, was due mostly to the relative performance of these two sectors.[19]

(vi) “ Gross ” and “ net ” industrial and agricultural output

The growth indices so far considered were those relating to the “ net output ” or “ value added ” of a given sector. While the concept of “ net output ” has been widely used in the centrally planned economies for measuring the performance of the economy as a whole, “ gross output ” indices represent a more frequently used yardstick for measuring the performance of individual sectors. This has been particularly true with respect to indices of output of industry and agriculture. “ Gross industrial output ” differs from “ net output ” not only in the inclusion of depreciation but also in that it includes the value of inter-industry turnover and of purchases from other sectors. “ Gross agricultural output ” includes, in addition to depreciation, the value of the turnover between farms and purchases from other sectors, also the value of output produced and used for production purposes within each farm. While both of these “ gross ” aggregates are characterized by a considerable amount of duplication, they have the advantage of providing a framework for measuring changes in inter-industry and inter-sectoral flows. Moreover, for agriculture, indices of “ gross production ” provide a better yardstick for measuring changes in the supply of farm products than do the corresponding “ net production ” or “ value added ” indices.[20]

Several factors are at work which may produce a considerable discrepancy between “ net ” and “ gross ” production indices. The weight attached to the various industrial branches is quite different in the “ gross ” and in the “ net ” production indices. And modern industrial growth is characterized by such processes as increasing specialization and co-operation, better utilization of raw and basic materials, substitution of materials and agricultural raw materials by those of industrial origin, etc., the net effect of which on the relationships discussed is difficult to predict. In the case of agriculture, the factors having a predominant influence on the relationship between “ net ” and “ gross ” output can be more easily identified. Foremost here is the marked increase in the use of industrial inputs per unit value of output witnessed in the post-war period.

The figures provided in table 2.7 indicate that in most countries of the group gross industrial output rose at a higher rate than net output, but only in selected cases was the difference between the growth rates very significant. The situation was different in agriculture, where the ratio of the net to gross output growth rate (exponential) varied in the range from as little as 20 to 87 per cent.[21] Both the “ net ” and the “ gross ”

TABLE 2.7

Growth rates of “ net ” and “ gross ” industrial and agricultural output, 1950-1967

	Industry				*Agriculture*			
	Net		*Gross*		*Net*		*Gross*	
Country	*Exponential rate*	*Geometric rate*	*Exponential rate*	*Geometric rate*	*Exponential rate*	*Geometric rate*	*Exponential rate*	*Geometric rate*
Bulgaria [a]	13.6	13.4	13.3	13.1	3.3	3.7	4.8	5.2
Czechoslovakia	7.0	7.2	8.6	8.8	−1.8	−1.6	1.7	1.9
Eastern Germany [a]	7.6	7.5	7.8	7.9	0.6	+1.0	1.8	2.1
Hungary	7.8	8.4	8.4	9.2	0.5	0.4	2.4	2.4
Poland	9.0	9.4	10.3	11.0	2.0	1.8	3.2	2.7
Romania	13.0	13.7	12.5	13.2	3.0	4.0	3.7	4.7
Soviet Union	10.1	10.5	10.3	10.5	3.9	3.6	4.5	4.1

[a] 1952-1967.

---

[18] It must be noted that the available indices for trade are affected in a number of countries by the practice of including foreign trade “ losses ”—largely a product of the prevailing price and accounting system.

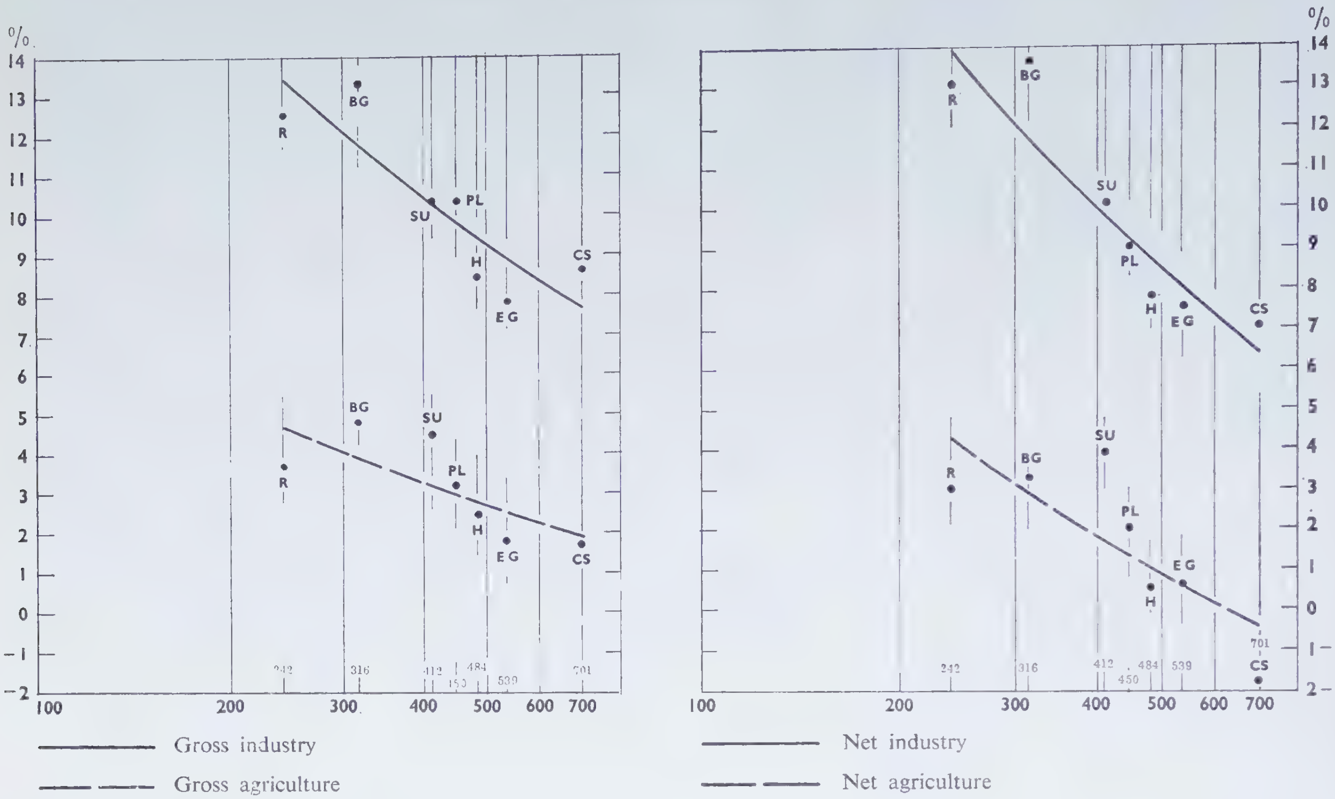
[19] The simple (linear) correlation coefficients between the growth rate of output and the per capita GDP level are as follows: industry −0.90; construction—0.59; agriculture and forestry—0.88; transport and communications—0.63; trade and other—0.10; total NMP—0.83; GDP total—0.82.

[20] The most appropriate measures of the growth of supply are, of course, indices based on “ final deliveries ” whether for consumption, investment or export. The only indices of this type available are those for agriculture in Poland.

[21] In Czechoslovakia net output of agriculture has actually declined during the period considered.

CHART 2.1

Growth rates of " net " and " gross " industrial and agricultural output 1950-1967 in relation to per capita GDP in 1950 [a]



[a] Per capita GDP values are calculated in terms of 1963 " average " prices.

BG = Bulgaria
CS = Czechoslovakia
EG = Eastern Germany

H = Hungary
PL = Poland
R = Romania
SU = Soviet Union

indices were correlated (inversely) with the level of per capita GDP, as can be seen from chart 2.1.

(vii) Trends in the growth rate of output

It is not easy to devise a method by which one would be able to determine unequivocally whether a given series displayed an acceleration, constancy or deceleration in its rate of change. Yet obviously past averages are an inadequate basis for projection and some attempt must be made to identify tendencies towards change within the period considered. The method adopted here consists of two steps: first, the annual rates of change obtained from the original net output indices are smoothed by means of a five-year moving average; second, a trend line derived from the equation $y = a + b\frac{1}{x}$ is fitted to the smoothed data by means of the least square procedure. The estimates obtained from this equation can be expected to express the trend value in each of the years reasonably well, provided the original data are not unduly influenced by medium-term (or severe short-term) fluctuations, a problem which is taken up in section 2.2 below.

In table 2.8 the estimated " trend " values for 1965 are compared with those for 1953.[22] The figures convey an impression of a general deceleration in the growth rates, whether output as a whole or of the individual sector is considered. The only exception is non-material services, where growth accelerated in most countries. For industry, the trend was upwards only in Hungary. It must be noted, however, that in this country the 1953 trend figures are influenced by the developments in 1954 and 1956 and evidently do not represent the " true " trend values for this year. For agriculture, an acceleration is apparent only in eastern Germany. The picture of decline in the growth rate is rather general in the remaining sectors of the material production

---

[22] The choice of these years, rather than of the terminal years 1951 and 1967, was dictated by the desire to avoid unnecessary extrapolations—even though the rates of change in 1951, 1952, 1966 and 1967 do influence the estimated trend line. Extrapolation would be necessary to cover the terminal years since the curve is fitted to averages centred on the years from 1953 through 1965.

TABLE 2.8

Sectoral growth rates of output, " trend " values for 1953 and 1965

Country	*Industry*		*Construction*		*Agriculture*		*Transport and communications*	
	1953	*1965*	*1953*	*1965*	*1953*	*1965*	*1953*	*1965*
Bulgaria	19.0 [a]	11.3	6.3 [a]	10.6	5.8 [a]	3.4	13.1 [a]	13.6
Czechoslovakia	9.8	5.8	19.2	4.3	0.2	−1.7	16.3	5.1
Eastern Germany	12.0 [a]	5.2	12.0 [a]	5.7	−0.4 [a]	1.4	5.2 [a]	2.8
Hungary	6.4	8.6	5.0	6.7	6.3	−0.1	10.4	7.9
Poland	11.6	8.0	8.0	5.8	2.6	2.2	10.9	7.5
Romania	13.8	12.7	19.9	9.0	10.1	3.7	15.8	9.7
Soviet Union	13.2	9.0	12.4	6.8	7.3	3.0	14.4	11.4

Country	*Trade and other*		*Material sectors total*		*Material sectors less agriculture*	
	1953	*1965*	*1953*	*1965*	*1953*	*1965*
Bulgaria	−1.6 [a]	6.9	7.7 [a]	8.1	11.0 [a]	10.7
Czechoslovakia	11.7	−1.4	7.7	3.8	10.9	4.9
Eastern Germany	8.0 [a]	3.5	8.7 [a]	4.5	10.6 [a]	4.8
Hungary	1.1	6.0	4.3	6.3	5.2	8.1
Poland	11.4	6.9	7.7	9.2	11.1	7.5
Romania	4.0	2.6	9.1	7.7	10.6	10.3
Soviet Union	15.7	5.3	11.1	7.0	13.4	8.3

[a] 1955.

sphere — Bulgaria and Hungary being the only exceptions.[23]

An important feature is that the deceleration in the growth rate tended to be strongest in the countries with a relatively high per capita income. Thus for the NMP as a whole no deceleration is evident for Bulgaria and only a relatively mild one for Romania. Czechoslovakia and eastern Germany, on the other hand, experienced a drop in the growth rate of nearly 50 per cent. Hungary, for reasons already given, provided the only important exception to this pattern.

(viii) " Current " versus " constant " price shares

The discussion has so far dealt with structural changes and growth relationships which can be discerned by analysing data expressed in constant prices. Elimination of the influence of price movements is obviously necessary if " real " changes in the production volume are to be measured, and constant price data also provide a meaningful framework for analysis of structural shifts when the effects of changing price and cost structures need to be removed. The latter is not always the case, however, and for some projection purposes knowledge of past trends in sector proportions in terms of current prices is also of great value.

Trends in relative sector prices, although induced more by central decisions than by the interplay of market forces, have been, on the whole, similar to those in market economies at comparable levels of economic development. This has been true with respect to the movement of industrial and agricultural prices, the former declining relative to the latter, an experience which, as can be seen by comparing the figures in table 2.5 with those in table 2.9, was shared by all countries.[24]

The figures indicate that the increase in the proportion of NMP accounted for by industry has everywheer been less marked in terms of current than of constant prices. In fact, in terms of current prices the industrial share in Czechoslovakia was no higher in 1967 than in 1950, and in eastern Germany it was only slightly higher. Differences between the movement in current and constant price shares have been even greater in the case of agriculture. The current price share of this sector actually rose in two countries and declined only slightly in most others, if the terminal years are compared.

The shift in relative prices of industry and agriculture, although characteristic of the whole post-war deve-

---

[23] The trend values under consideration refer to " net output ". For industry and agriculture the following comparable figures for " gross output " can be estimated :

	Trend values			
	Industry		*Agriculture*	
	1953	*1965*	*1953*	*1965*
Bulgaria	14.4 [a]	12.8	4.2 [a]	4.9
Czechoslovakia	11.5	6.5	1.6	1.4
Eastern Germany	9.4 [a]	6.2	−0.2 [a]	2.5
Hungary	9.6	7.2	4.6	1.8
Poland	15.4	7.6	2.3	2.9
Romania	12.5	12.0	7.7	2.5
Soviet Union	13.4	8.6	7.3	3.0

[a] 1955.

[24] Total and sectoral price indices are given in Appendix table 2.IV.

TABLE 2.9

Percentage distribution of NMP by sectors of origin, 1950-1967 in terms of current prices

Country and sector	*1950*	*1953*	*1955*	*1958*	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*
Bulgaria	*a*											
1. Industry	37.3	34.5	33.6	41.2	46.0	46.0	44.4	44.8	44.8	45.0	44.8	46.2
2. Construction	6.5	6.4	6.8	5.8	7.0	7.0	7.3	7.0	7.1	7.3	7.8	8.4
3. Agriculture	28.4	29.8	31.9	35.5	32.0	32.0	33.4	33.3	34.0	33.4	34.5	31.4
4. Other	27.9	29.2	27.7	17.5	15.0	15.0	14.9	14.9	14.1	14.2	12.9	13.9
Czechoslovakia												
1. Industry	61.4	66.9	62.2	62.4	62.3	64.3	66.9	66.8	63.8	64.9	64.5	60.4
2. Construction	8.7	9.6	10.4	10.8	10.6	10.5	9.6	8.1	8.7	9.3	9.3	12.5
3. Agriculture	17.4	13.5	15.5	15.3	15.7	14.0	12.3	14.0	14.2	13.3	13.8	13.0
4. Other	12.5	10.1	11.9	11.5	11.4	11.2	11.3	11.1	13.3	12.6	12.4	14.2
Eastern Germany	*a*											
1. Industry	56.3	55.5	61.0	63.5	65.2	66.1	66.7	66.0	64.4	64.0	63.9	59.2
2. Construction	5.5	5.7	5.8	5.7	5.9	5.9	5.8	5.4	5.3	5.4	5.2	7.6
3. Agriculture	10.2	9.0	9.6	10.4	9.5	9.0	8.3	9.7	10.6	11.6	11.9	13.9
4. Other	28.0	29.8	23.7	20.5	19.4	19.1	19.2	18.9	19.7	19.0	19.0	19.3
Hungary												
1. Industry	46.7	51.1	48.3	49.8	54.7	58.2	58.8	59.1	59.0	57.5	55.3	55.8
2. Construction	6.5	6.5	5.3	7.0	11.0	10.0	9.8	9.6	9.4	10.2	9.9	10.3
3. Agriculture	24.4	22.4	30.2	28.2	22.0	19.8	19.8	19.7	20.2	19.6	21.8	20.6
4. Other	22.4	20.0	16.3	14.9	12.3	12.0	11.6	11.6	11.4	12.7	13.0	13.3
Poland												
1. Industry	46.6	..	..	47.4	47.0	47.9	50.3	49.8	51.0	51.6	51.9	50.4
2. Construction	7.1	..	..	8.4	9.7	8.9	9.0	8.9	8.9	8.9	9.0	9.7
3. Agriculture	24.4	..	..	27.2	25.9	26.7	23.0	23.5	22.3	22.7	22.4	21.8
4. Other	21.9	..	..	17.0	17.4	16.5	17.8	17.8	17.8	16.7	16.7	18.2
Romania												
1. Industry	44.0	42.2	39.8	42.7	44.1	45.0	48.8	46.9	48.1	48.9	48.6	51.7
2. Construction	6.0	6.8	5.6	7.7	9.0	8.7	8.8	8.3	8.2	8.0	7.8	8.4
3. Agriculture	28.0	33.9	37.6	34.8	33.1	33.0	29.4	29.8	29.5	29.3	31.4	28.6
4. Other	22.0	17.1	17.0	14.8	13.8	13.3	13.0	15.0	14.2	13.8	12.2	11.3
Soviet Union												
1. Industry	..	..	..	50.2	52.3	52.1	52.3	54.2	53.5	51.7	50.3	51.4
2. Construction	..	..	..	9.5	10.0	9.8	8.9	9.0	8.8	9.3	9.2	9.4
3. Agriculture	..	..	..	24.1	20.5	21.0	22.5	20.5	21.5	22.5	24.3	22.4
4. Other	..	..	..	16.2	17.2	17.1	16.3	16.3	16.2	16.5	16.1	16.7

[a] 1952.

lopment period, was more pronounced during the 1950s than during the 1960s. In terms of changes in sector proportions, this had a particular impact on the agricultural share, which, in terms of current prices, tended to increase in most countries during the 1950s. This is notwithstanding the fact that in terms of constant prices, the decline in the agricultural share was steeper in the early than in the more recent period.

The movement of prices in the other two sectors distinguished in the tables was less uniform. The observed increase in the proportion of NMP accounted for by construction is, in some cases, more marked and in others less marked in terms of current than in constant prices. The implied decline in some countries in the relative prices of construction was due, however, entirely to developments during the 1950s. Since then, the tendency has been for construction prices to rise relatively to the average in the economy as a whole. The relative movement of prices in the material service sector has been to some extent similar, particularly with respect to the rising tendency during more recent years.

(ix) Structural changes in employment

Growth rates of employment by sectors are shown in table 2.10. The sectoral pattern of increase in employment was in some respects similar to that of output but important differences must also be noted. Variations as between different sectors were less pronounced in the growth rate of employment than in the growth rate of output. In agriculture, however, employment declined everywhere except in Poland where little change

TABLE 2.10

Growth of employment by sectors, 1950-1967

(A = Exponential growth rate; B = Geometric growth rate)

Country	Total	Industry	Construction	Agriculture	Transport and communications	Trade and other	Non-material services	Material sectors less agriculture
Bulgaria [a]								
A	0.5	6.4	7.3	−3.0	4.2	3.7	3.2	5.9
B	0.5	6.0	6.5	−3.0	5.6	3.4	3.1	5.7
Czechoslovakia								
A	1.0	2.6	2.6	−3.1	2.3	1.3	3.9	2.3
B	1.1	2.6	2.7	−2.8	2.5	1.1	3.9	2.3
Eastern Germany [a]								
A	0.0	0.1	0.0	−2.4	0.3	0.4	2.6	0.1
B	0.3	0.3	0.2	−2.0	0.4	0.7	2.6	0.4
Hungary								
A	0.9	3.9	2.3	−2.1	3.2	3.0	1.3	3.5
B	1.0	4.0	4.1	−2.0	3.5	2.7	1.3	3.7
Poland								
A	1.7	3.5	2.5	0.1	4.3	2.1	3.5	3.2
B	1.8	3.9	3.9	0.0	4.2	1.9	3.7	3.6
Romania [b]								
A	0.8	4.2	5.4	−1.1	3.7	3.4	4.1	4.2
B	0.9	4.1	6.6	−0.9	4.0	4.1	3.9	4.5
Soviet Union								
A	1.9	3.1	4.6	−1.0	3.8	5.0	4.4	3.7
B	2.0	3.3	4.5	−0.8	3.7	4.7	4.2	3.7

[a] 1952-1957. [b] 1951-1957.

was registered. Although employment in industry rose steeply the rate of increase was slower in a number of countries than that of some other sectors (quite frequently in construction and—most notably—in non-material services).

Inter-country variations in the growth of employment in industry are less well correlated with GDP per capita levels than are the inter-country variations in the growth of industrial output; the opposite situation is found in construction. Although the correspondence is not strict, there has undoubtedly been a negative association between changes in the labour force in the other non-agricultural material sectors and differences in development levels. However, no such association can be found in the case of agriculture and non-material services.[25]

Table 2.11 depicts the great shifts which took place in the employment structure of the centrally planned economies during the post-war period. Although these shifts tended to narrow inter-country differences in employment structures, differences remain considerable. At one extreme in 1967, east German industry employed 42 per cent and agriculture 15 per cent of the labour force, while the comparable figures for Romania were 20 and 55 per cent respectively. As can be seen from the same table, sectoral changes of employment resulted in increases in the share of all the non-agricultural sectors, trade in some countries being the only exception.[26]

(x) Trends in the growth rate of employment

As in output, the picture of changes in the employment growth rates is one of general deceleration; non-material services stands out as the only sector where the tendency was generally in the opposite direction (see table 2.12). The decline in the agricultural labour force tended to be faster in more recent years than in the early 1950s; and, although industrial employment continued to rise

---

[25] The simple (linear) correlation coefficients between the growth rate of employment and per capita GDP level are as follows: industry—0.61, construction—0.71, transport and communications—0.57, trade and other—0.65, material sectors (excluding agriculture)—0.68, agriculture—0.37, material sectors total—0.7, non-material services—0.17, total employment—0.0.

[26] This was with the exception of eastern Germany where the only sector whose share had increased on account of the decline of the share of agriculture was that of non-material services.

TABLE 2.11

Distribution of employment by sectors, 1950-1967

(Percentages)

Country and sector	*1950*	*1953*	*1955*	*1958*	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*
Bulgaria	[a]											
Industry	13.0	13.5	14.4	17.7	22.3	22.5	22.9	23.9	24.5	26.0	28.1	29.2
Construction	3.0	3.0	3.2	2.9	4.3	4.6	5.0	5.4	5.5	5.9	6.6	7.2
Agriculture and forestry	69.7	68.2	65.6	61.8	54.0	52.8	51.7	49.6	48.5	46.1	43.2	41.0
Transport and communications	2.2	2.9	3.3	3.4	4.0	4.2	3.9	4.0	4.2	4.2	4.4	4.6
Other	3.3	3.4	3.6	4.0	4.3	4.5	4.6	4.8	5.0	5.2	4.9	5.1
Material sectors	91.1	91.0	90.1	89.8	89.0	88.5	88.1	87.7	87.7	87.5	87.2	86.9
Non-material services	8.9	9.0	9.9	10.2	11.0	11.5	11.9	12.3	12.3	12.5	12.8	13.1
Czechoslovakia												
Industry	30.0	32.5	32.6	34.6	37.3	37.9	38.5	38.2	38.2	38.3	38.6	38.4
Construction	6.3	7.1	6.8	7.5	8.3	8.5	8.3	8.0	8.0	8.0	8.2	8.3
Agriculture and forestry	38.6	34.5	34.0	30.6	25.9	24.0	23.0	22.5	21.8	21.1	20.6	19.9
Transport and communications	5.1	5.6	5.7	6.0	6.1	6.2	6.2	6.3	6.4	6.5	6.5	6.5
Other	8.6	8.2	8.3	8.1	8.2	8.5	8.5	8.8	8.9	8.8	8.6	8.6
Material sectors	88.7	87.8	87.4	86.9	85.8	85.0	84.5	83.9	83.3	82.6	82.4	81.8
Non-material services	11.3	12.2	12.6	13.1	14.2	15.0	15.5	16.1	16.7	17.4	17.6	18.2
Eastern Germany	[a]											
Industry	41.2	41.5	40.8	42.6	41.9	41.5	41.2	41.9	41.4	41.4	41.5	41.6
Construction	6.2	6.4	5.9	6.1	6.1	5.9	6.1	6.2	6.0	6.1	6.0	6.2
Agriculture and forestry	21.8	21.1	21.7	19.2	17.4	17.6	17.7	16.4	16.4	16.1	15.7	15.3
Transport and communications	6.9	6.8	6.8	6.6	6.6	6.7	6.6	6.7	7.3	7.1	7.1	7.1
Other	10.7	10.9	11.0	11.4	11.5	11.6	11.2	11.2	11.3	11.5	11.5	11.4
Material sectors	86.8	86.7	86.3	85.9	83.6	83.3	82.8	82.4	82.4	82.2	81.8	81.6
Non-material services	13.2	13.3	13.7	14.1	16.4	16.7	17.2	17.6	17.6	17.8	18.2	18.4
Hungary												
Industry	19.7	23.2	24.9	26.4	28.0	28.9	29.6	30.5	31.5	32.1	32.1	32.5
Construction	4.0	6.4	4.8	5.1	5.6	5.6	5.7	5.9	5.8	6.1	6.5	6.7
Agriculture and forestry	50.1	43.4	43.1	42.3	38.7	36.5	34.9	33.1	31.6	30.9	30.4	30.0
Transport and communications	4.1	5.1	5.3	5.4	5.9	6.1	6.2	6.3	6.3	6.3	6.3	6.3
Other	5.4	5.4	6.0	6.2	6.7	6.9	7.0	7.4	7.3	7.1	7.1	7.2
Material sectors	83.4	83.4	84.1	85.5	84.8	84.0	83.4	83.0	82.6	82.5	82.4	82.6
Non-material services	16.6	16.6	15.9	14.5	15.2	16.0	16.6	17.0	17.4	17.5	17.6	17.4
Poland												
Industry	17.8	19.6	20.5	22.2	22.1	22.3	22.8	23.1	23.4	24.0	24.4	25.0
Construction	4.7	6.6	6.1	5.9	6.2	6.3	6.2	6.5	6.2	6.3	6.4	6.6
Agriculture and forestry	56.5	52.4	50.8	48.7	47.5	46.8	45.8	44.9	44.8	43.8	42.9	41.7
Transport and communications	3.7	4.0	4.4	5.0	5.1	5.1	5.1	5.2	5.2	5.3	5.5	5.5
Other	6.6	6.2	6.3	6.0	6.3	6.5	6.7	6.8	6.6	6.7	6.7	6.7
Material sectors	89.4	88.8	88.0	87.9	87.2	86.9	86.6	86.4	86.2	86.1	85.9	85.6
Non-material services	10.6	11.2	12.0	12.1	12.8	13.1	13.4	13.6	13.8	13.9	14.1	14.4
Romania	[b]											
Industry	12.1	12.4	13.0	13.7	14.7	15.6	16.5	17.2	17.9	18.7	19.5	19.9
Construction	2.9	4.5	4.3	3.5	4.5	5.2	6.1	6.6	6.5	6.4	6.5	6.9
Agriculture and forestry	73.5	71.1	69.9	69.6	66.8	64.4	62.0	60.2	58.9	57.4	56.0	54.6
Transport and communications	2.3	2.5	2.7	2.7	2.8	2.9	3.0	3.2	3.4	3.6	3.7	3.8
Other	2.8	3.2	3.6	3.6	3.6	3.8	3.9	4.0	4.2	4.4	4.5	4.6
Material sectors	93.6	93.6	93.4	93.1	92.4	91.9	91.5	91.2	90.9	90.6	90.2	89.8
Non-material services	6.4	6.4	6.6	6.9	7.6	8.1	8.5	8.8	9.1	9.4	9.8	10.2
Soviet Union												
Industry	23.5	25.4	25.6	25.9	26.2	26.9	27.6	28.2	29.0	28.8	29.1	29.2
Construction	4.0	4.1	4.4	5.4	6.1	6.1	5.9	5.9	4.3	6.0	6.0	6.0
Agriculture and forestry	48.8	45.4	44.8	42.1	38.8	36.7	35.3	33.8	33.3	31.8	31.1	30.5
Transport and communications	6.0	6.6	6.6	7.0	7.5	7.6	7.7	7.9	8.1	8.0	7.9	7.9
Other	5.6	5.8	6.0	6.3	7.1	7.4	7.7	8.0	8.4	8.5	8.6	8.8
Material sectors	87.8	87.3	87.4	86.7	85.6	84.8	84.3	83.8	83.0	83.0	82.7	82.4
Non-material services	12.2	12.7	12.6	13.3	14.4	15.2	15.7	16.2	17.0	17.0	17.3	17.6

[a] 1952. [b] 1951.

quickly in a number of countries, it was only in Romania that the 1965 trend value was higher than that of 1953. The pattern of change in the remaining sectors was less uniform, particularly in construction and trade.

There appears to have been little association between the sectoral pattern changes of employment growth and differences in development levels. However, such an association can be discerned if the non-agricultural labour force is considered as a whole. A significant deceleration in the growth rate of the non-agricultural labour force occurred in Poland and an acceleration in Romania. In effect the inter-country pattern of growth of non-agricultural employment came to correspond rather closer, in recent years, to the pattern of inter-country differences in per capita income levels. This is shown by the following figures:

Growth of non-agricultural labour force (per cent)

Country [a]	Average [b] 1950-1967	" Trend " value 1953	" Trend " value 1965
Romania	4.4	3.2	4.6
Bulgaria	5.1 [c]	5.2	5.1
Soviet Union	3.8	3.1	4.1
Poland	3.6	4.5	2.9
Hungary	3.0	3.1	2.7
Eastern Germany	0.8 [c]	1.1	0.3
Czechoslovakia	2.7	2.9	2.5

[a] In ascending order of estimated GDP per capita level in 1950 from the lowest to the highest.

[b] Geometric rate.

[c] 1952-1967.

(xi) Output per worker by sector

Notwithstanding the generally sharp drop in the agricultural labour force, the increase in labour productivity in agriculture was, in most countries, less pronounced than in industry and its related sectors—construction and transportation.[27] A tendency for agricultural labour productivity to rise at a slower rate than in industry is evident also if the " gross " output rather than the " net " output is considered, as shown in columns 7 and 8 of table 2.13. The relative growth of labour productivity in the other sectors followed a less uniform pattern, although certain generalizations can also be made here. Productivity in transportation tended to rise at a higher rate and in construction at a lower rate than in industry, and in most countries the growth of labour productivity was lowest in the trade sector.[28] Inter-country differences in the growth of labour productivity have been rather large for all sectors. The greatest association between the pattern of variation in the growth rates and that in per capita GDP levels was in industry and agriculture.[29]

The shifts in relative sectoral productivity brought about by the described productivity changes are shown in the first part of table 2.14. In all of the countries labour productivity in agriculture decreased in relation to the national average. A decline also took place in construction, except for Czechoslovakia and eastern Germany, two countries which—as will be recalled—had the smallest increase in the non-agricultural labour force. In industry and transportation the trends were somewhat more mixed, although in most cases there was an increase in the relative productivity of these sectors, as measured in constant prices.

The figures presented in the second part of the table indicate that in the early 1950s inter-sectoral differences in output per man as measured in current prices were extremely large in all the centrally planned economies. This was so even if allowance is made for the fact that the structure of sectoral prices is particularly uneven in the centrally planned economies, most of the " turnover taxes " and profits deriving from industry. The differences appear particularly striking when output per man in the various sectors is related to output per man in agriculture. Thus, output per man in industry was 3 to 9 times as great, and in construction 2 to 5 times as great as in agriculture. In some countries an even higher ratio occurred in the trade sector. Largely reflecting the impact of the previously described relative price movements, the general tendency has been for differences in sectoral output per man to narrow. As can be seen from the table, output per man in industry in 1967 was only between 1.5 and 4, and in construction 1.4 and 2.8 times higher than in agriculture. A considerable narrowing also took place in the ratios for the trade sector.

Indices of difference in sectoral product per worker

Country [a]	Current prices 1950	Current prices 1967	Constant (1963) prices 1950	Constant (1963) prices 1967
Romania	101	64	56	70
Bulgaria	96 [b]	34	50 [b]	39
Soviet Union	63	36	39	44
Poland	77	55	40	59
Hungary	71	38	51	52
Eastern Germany	38 [b]	17	19 [b]	30
Czechoslovakia	58	31	30	43

[a] In ascending order of estimated GDP per capita in 1950.

[b] 1952.

The narrowing of productivity differences as between sectors is more clearly indicated by the indices presented above providing a measure of inequality of sectoral product per worker.[30] It can be seen that, whereas in " real terms " the sectoral spread in productivity per worker rose between 1950 and 1967 everywhere except in Bulgaria, in terms of current prices the differences narrowed very significantly in all countries. However,

---

[27] Total and sectoral output per man indices are given in Appendix table 2.III.

[28] As already mentioned, however, limited importance can be attached to the productivity figures in this sector.

[29] The linear correlation coefficients between the growth rate of labour productivity and the per capita GDP level are as follows: industry—0.64, construction—0.49, agriculture—0.70 transport and communications—0.51, trade and other—0.31, material sector (excluding agriculture)—0.21, total NMP—0.73.

[30] The indices are calculated as the sum of the differences between the percentage distribution of output and of employment regardless of sign.

TABLE 2.12

Sectoral growth rates of employment, " trend " values for 1953 and 1965

Country	Industry		Construction		Agriculture		Transport and communications		Trade and other		Material sectors total		Material sectors less agriculture		Non-material sectors		Total	
	1953	1965	1953	1965	1963	1965	1963	1965	1963	1965	1963	1965	1963	1965	1953	1965	1953	1965
Bulgaria	8.0[a]	5.7	−0.9[a]	11.8	−1.3[a]	−3.9	7.9[a]	2.1	3.6[a]	4.0	0.4[a]	0.0	6.1[a]	5.8	2.8[a]	3.4	0.6[a]	0.4
Czechoslovakia	3.2	2.3	3.2	2.1	−0.2	−3.9	3.6	1.9	0.5	1.8	1.4	0.3	2.7	2.1	2.8	4.4	1.4	0.9
Eastern Germany	1.1[a]	−0.4	0.1[a]	0.0	−1.8[a]	−2.8	−1.4[a]	1.1	1.8[a]	−0.4	0.2[a]	−0.8	0.2[a]	−0.8	2.3[a]	2.6	0.4[a]	−0.2
Hungary	6.1	3.0	1.4	2.5	0.5	−3.0	6.4	2.0	4.6	2.6	2.2	0.3	5.1	2.8	−1.3	2.4	1.6	0.7
Poland	5.2	3.0	5.1	1.5	0.0	0.1	7.9	3.1	0.7	2.7	1.8	1.4	4.6	2.7	4.3	3.3	2.0	1.6
Romania	3.1[b]	4.7	3.1[b]	6.9	2.2[b]	−2.4	3.2[b]	4.0	5.8[b]	2.4	2.2[b]	−0.2	3.3[b]	4.6	2.9[b]	4.6	2.2[b]	0.1
Soviet Union	3.1	3.1	6.3	4.7	1.0	−1.7	3.8	3.7	2.4	6.0	2.0	1.3	3.6	3.7	1.8	5.4	1.9	1.9

[a] 1955. [b] 1954.

TABLE 2.13

Growth of output per man by sectors, 1950-1967

(A = Exponential growth rate; B = Geometric growth rate)

Country	Net output						Gross output	
	Industry	Construction	Agriculture	Transport and communications	Trade and other	Material sectors less agriculture	Industry	Agriculture
Bulgaria [a]								
A	6.8	1.7	6.6	8.8	−0.1	4.6	6.5	8.1
B	6.9	3.1	6.9	8.3	0.9	4.9	6.6	8.5
Czechoslovakia								
A	4.4	5.5	1.3	5.7	0.4	4.2	5.9	4.9
B	4.6	7.0	1.2	6.4	1.7	4.6	6.1	4.8
Eastern Germany [a]								
A	7.5	7.7	3.1	3.2	4.6	6.7	7.7	4.3
B	7.1	7.2	3.1	3.8	4.8	6.5	7.5	4.2
Hungary								
A	3.8	3.7	2.6	5.2	1.2	3.7	4.4	4.6
B	4.2	2.8	2.5	6.0	0.9	3.8	5.0	4.4
Poland								
A	5.3	4.4	2.0	4.0	5.8	5.2	6.6	3.0
B	5.3	4.3	1.8	4.6	5.0	5.1	6.9	2.6
Romania								
A	8.2	5.0	3.7	6.6	−1.3	5.6	7.8	4.5
B	8.4	4.0	3.3	7.4	−3.2	5.1	8.1	4.6
Soviet Union								
A	6.8	3.6	4.9	8.1	2.9	5.9	6.9	5.5
B	6.9	4.0	4.4	7.5	4.0	6.2	7.0	4.9

[a] 1952-1967.

TABLE 2.14

Product per worker by sector, as percentage of the national average, 1950 and 1967 [a]

Country	Industry		Construction		Agriculture		Transport and communications		Trade and other	
	1950	1967	1950	1967	1950	1967	1950	1967	1950	1967
					In terms of 1963 prices					
Bulgaria	166 [b]	146	188 [b]	99	68 [b]	60	83 [b]	89	447 [b]	167
Czechoslovakia	143	143	73	110	79	45	34	45	103	65
Eastern Germany	113 [b]	128	72 [b]	81	80 [b]	52	73 [b]	51	126 [b]	102
Hungary	177	161	169	122	62	43	46	55	157	82
Poland	174	183	140	126	68	40	102	95	139	141
Romania	184 [c]	248	145 [c]	109	65 [c]	42	92 [c]	102	617 [c]	133
Soviet Union	147	158	180	119	71	51	51	60	148	99
					In terms of current prices					
Bulgaria	261 [b]	138	197 [b]	102	37 [b]	67	125 [b]	79	689 [b]	169
Czechoslovakia	182	129	123	123	40	53	57	56	95	92
Eastern Germany	119 [b]	116	77 [b]	101	41	74	71 [b]	60	181 [b]	101
Hungary	197	142	135	127	41 [b]	57	118	63	254	98
Poland	234	173	134	126	39	45	145	95	204	153
Romania	341 [c]	234	194 [c]	109	36 [c]	47	172 [c]	100	590 [c]	137
Soviet Union	(188)	145	(167)	129	(49)	61	(59)	62	(177)	101

[a] Corresponding to NMP coverage. [b] 1952 [c] 1951.

of most importance is the fact that these changes have been consistent with the pattern of inter-country variation of the indices according to which differences between sectors in output per man have tended to be larger in the industrially less developed than in the more developed countries.

(xii) Trends in the growth rate of output per man

In industry and construction, trends in the growth rate of output per man have corresponded closely with those in output; in other sectors there was less similarity (see table 2.15). Only in Hungary [31] was there an upward trend in the growth of labour productivity in industry and construction. However, in three of the seven countries the growth of output per man in agriculture tended to accelerate, significantly higher trend values being observed in Czechoslovakia and eastern Germany. Rather diverse changes occurred in the other sectors, the 1965 trend values being in some cases higher and in others lower than in 1953.

If the material sectors are considered as a whole, one finds two countries—besides Hungary— in which output per man tended to rise faster in recent years than in the early development period. These were the two relatively least developed countries—Bulgaria and Romania—the speed-up being marked in the latter. On the other hand, Czechoslavakia and eastern Germany experienced a steep decline in the growth rate of output per man, a pattern similar to that found in output and employment. It is also significant that an association between changes in productivity growth rates (implied by trend values for 1953 and 1965 respectively) and relative development levels is also to be found when agriculture is excluded.

(xiii) An experiment in comparing economic structures

How does the structure of output and employment in the centrally planned economies compare with the corresponding structures in other countries at comparable levels of economic development ? A cross country analysis of 28 market economies was made to determine the " expected " or " normal " distribution of output and employment at given levels of per capita GDP. Some of the basic data used in this exercise are shown in Appendix table 2.V. The preliminary results of regression analysis are shown in chart 2.2. The " expected " values read from this chart are used here to provide rough guides to the extent to which the actual patterns in the centrally planned economies appear to differ from the international pattern.[32] Since, as already mentioned, the structure of sectoral prices in the centrally planned economies differs considerably from those of the market economies, it is the employment structures which lend themselves more easily to comparison. The data for this are provided in table 2.16: they suggest a number of findings.

In most of the centrally planned economies, the proportion of the labour force employed in industry (and construction) was not very significantly different from that " expected " on the basis of the per capita GDP level.[33] This was not so, however, for agriculture and services, employment in the former sector being in most cases higher, and that in the latter sector in all cases lower than " expected ". While a relatively lower proportion of employment in services as compared with market economies may partly reflect differences in requirements conditioned by institutional factors, it may also reflect a genuine deficiency in the supply of some types of services.

Changes over time have accentuated these characteristics in the employment structure. Between 1950 and 1967, the Soviet Union joined the group of countries in which the share of agricultural employment was higher than " expected ", and in two countries—Poland and Romania—the extent of " excessive " agricultural employment became much greater. Whereas in the early 1950s the proportion of employment in the service sector had been significantly lower than " expected "

---

[31] The Hungarian productivity figures for 1953 are affected even more than those of output by the developments already mentioned.

[32] The results of the secretariat study ought to be considered as tentative.

[33] An exception was eastern Germany in the early 1950s, the proportion of the labour force in industry being much higher than " expected ". This suggests that the per capita GDP in this period was still affected by dislocations due to the war.

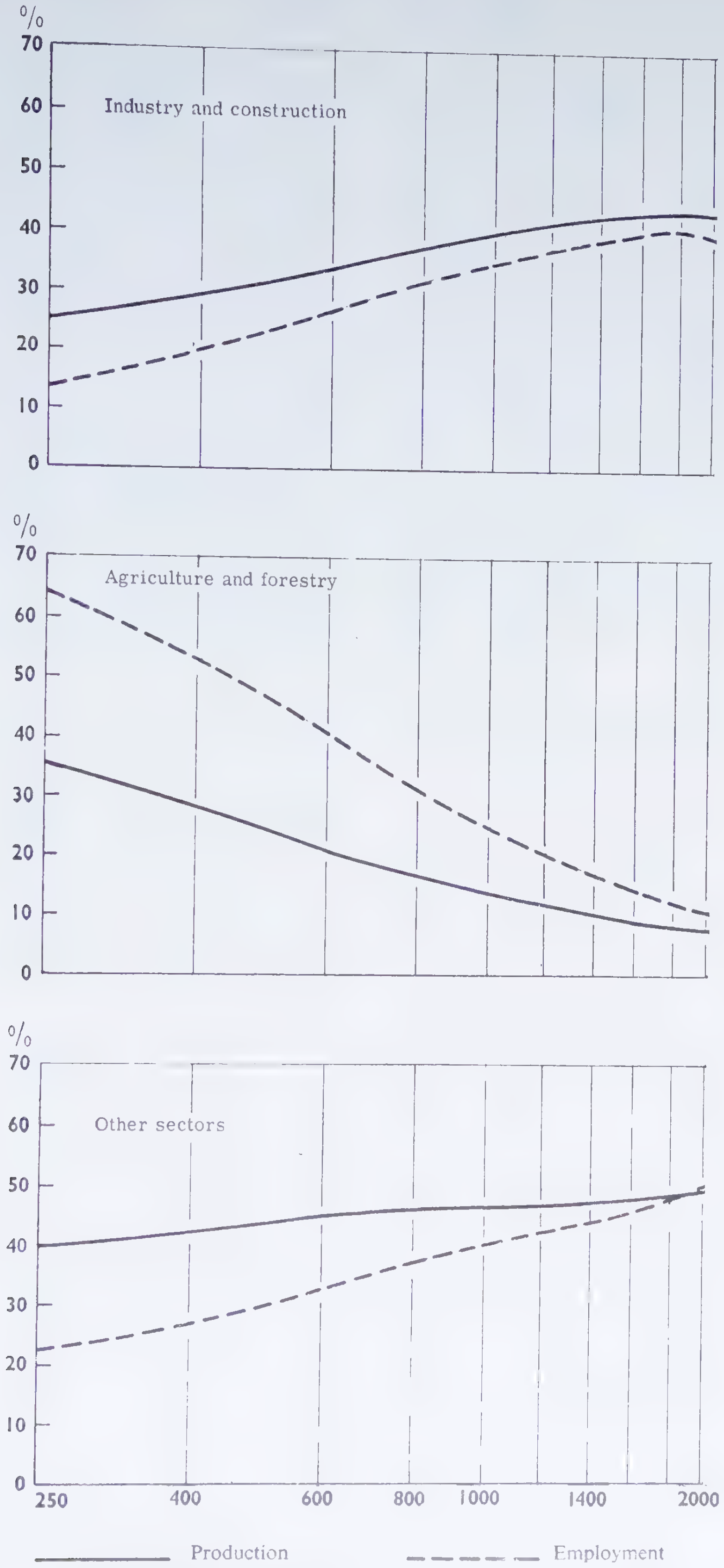
TABLE 2.15

Sectoral growth rates of output per man, " trend " values for 1953 and 1965

Country	*Industry*		*Construction*		*Agriculture*		*Transport and communications*		*Trade and other*		*Material sectors total*		*Material sectors less agriculture*	
	1953	*1965*	*1953*	*1965*	*1953*	*1965*	*1953*	*1965*	*1953*	*1965*	*1953*	*1965*	*1953*	*1965*
Bulgaria	10.1	5.3	7.3	−1.1	7.2	7.6	4.7	11.3	−5.0	2.8	7.3	8.2	4.6	4.7
Czechoslovakia	6.5	3.4	15.5	2.1	0.4	2.2	12.3	3.1	11.1	−3.1	6.2	3.5	8.1	2.7
Eastern Germany	10.8	5.7	11.9	5.7	1.4	4.4	6.7	1.6	6.1	4.0	8.6	5.3	9.7	5.1
Hungary	0.3	5.3	3.5	4.0	5.8	3.0	3.8	5.7	−3.4	3.3	2.1	5.9	0.1	5.2
Poland	6.1	4.9	4.7	4.2	2.5	2.1	2.8	4.2	10.6	4.0	5.8	4.7	6.3	4.7
Romania	10.4	7.6	16.3	2.0	7.8	6.3	12.1	5.4	−1.7	0.2	6.8	7.9	7.1	5.4
Soviet Union	9.8	5.7	5.7	2.0	6.2	4.8	10.3	7.4	12.9	−0.6	8.9	5.6	9.6	4.5

CHART 2.2

Estimated production and employment shares as a function of per capita GDP in 1960 [a]



---

[a] Per capita GDP values are calculated in terms of 1963 "average" prices. For basic data see Appendix table 2.V.

in only four countries, in 1967 there was a marked deviation from " normal " in this sector in all countries. Only in Bulgaria and Hungary has the industrial sector " gained " from the greater relative " under-development " of the service sector.

In contrast to employment, the proportion—when measured in current prices—of output in industry and construction was in all countries higher than " expected " (see table 2.17). In the early 1950s, both the agricultural and the service sector had a lower than " expected " share; in 1967 only the service sector had a lower share. Since, as already mentioned, changes in relative sectoral prices have been in favour of agriculture, the picture which one obtains is rather different if the comparison is made in terms of 1963 prices, particularly in the early period. On the basis of such valuation, the share of industry in the early 1950s was closer to the " expected ", but in most countries the share of agriculture was higher. In effect, the structure of production was more similar to that of employment.

The fact that in the centrally planned economies the share of industry in output is significantly higher than in the market economies, at the time when its share in employment is generally not, is something which would be expected in the light of the known differences in price structures. Of more interest is the finding that in terms of recently prevailing prices the share of agriculture is not lower than the average for market economies at similar development levels; in fact, in most countries it is higher—very significantly so in Bulgaria.

The data provided in table 2.18 indicate that, whereas in terms of prices as late as those of 1963, product per worker in agriculture was, in 1967, lower than " expected " everywhere excepting Bulgaria, the increase in relative agricultural prices which had taken place since was in a number of countries sufficient to raise the relative agricultural productivity to a level equal to or exceeding that " expected ". This applies to eastern Germany, Hungary and the Soviet Union. Only in Czechoslovakia and Poland (no data are available for Romania) has product per worker in agriculture remained lower than " expected ".

Since the value of " non-material " services was calculated here on the basis of relationships found in market economies, differences between colum 7 and colums 8 and 9 of the same table are indicative only of deviations relating to output per man in material services. It can be seen that in 1967 in terms of current prices the relative value of output per man in material services has been higher than expected in Bulgaria and Poland. It was lower in all other countries. The very recent price movements have been such as to create a downward deviation relative to the " expected ".

2.2 PROJECTED GROWTH AND STRUCTURE FROM 1965 TO 1980

(i) Analysis of past growth path

In the analysis of past trends and growth patterns in the preceding section of this chapter, little attention was given to the actual path along which production grew during the period. Historical averages, aided by a knowledge of the direction in which the growth rate tended to move, represent a valuable guide for the purpose of projection. However, averages may be sensitive to changes in the time period for which they are estimated, and there is no sure way of distinguishing between temporary variations and long-term shifts in the trend line. It is therefore necessary to analyse in more detail the pattern of fluctuations of the growth rate over time. The general availability of plans for the centrally planned economies for 1970 and the apparent certainty of fulfilment—and in some cases over-fulfilment—of the aggregate production plans make it possible to extend this aspect of the analysis to the period up to 1970. In order to avoid unnecessary estimates, this is done by utilizing NMP figures as a basis (re-weighted values). Five-year moving averages of growth rates, together with their arithmetic average over the whole of the period 1950-1970, are shown in chart 2.3.

Growth has been far from even during the period considered. There were periods of relatively fast and of slower movement, such phases being in evidence even after fluctuations of relatively small duration and amplitudes are eliminated from the data. Ignoring some special cases, two full swings—each of approximately eight years' duration—can be distinguished. These swings are shaped by dips in the growth rate, one centred around 1954 and the other around 1963.

This is obviously not the place to undertake an exhaustive analysis of these movements. It appears necessary, however, to trace the link which has evidently existed between the various growth phases, thus enabling a somewhat better appraisal of the present position.

Of the two swings described, the first—covering the period roughly from 1950 to 1958—has been discussed most widely in economic literature. A sharp increase of investment activity, availability of easily-tapped labour resources and fuller utilization of plant capacity are the factors commonly credited with high growth rates characterizing the early 1950s. With the development pattern extremely unbalanced, however, various barriers to growth soon made their appearance, reflected in—among other things—disequilibria in consumer markets, shortages of raw and basic materials, freezing of investment resources in unfinished construction, rising production costs and, not least, imbalances in foreign trade.

Given the substantial imbalances, it is somewhat puzzling that the ensuing decline in the growth rate was, in a number of cases, not very marked and the recovery was rather steep. However, it has been argued that it was the very imbalance of the early development drive that permitted the relatively rapid smoothing out

CHART 2.3

Annual percentage growth of NMP

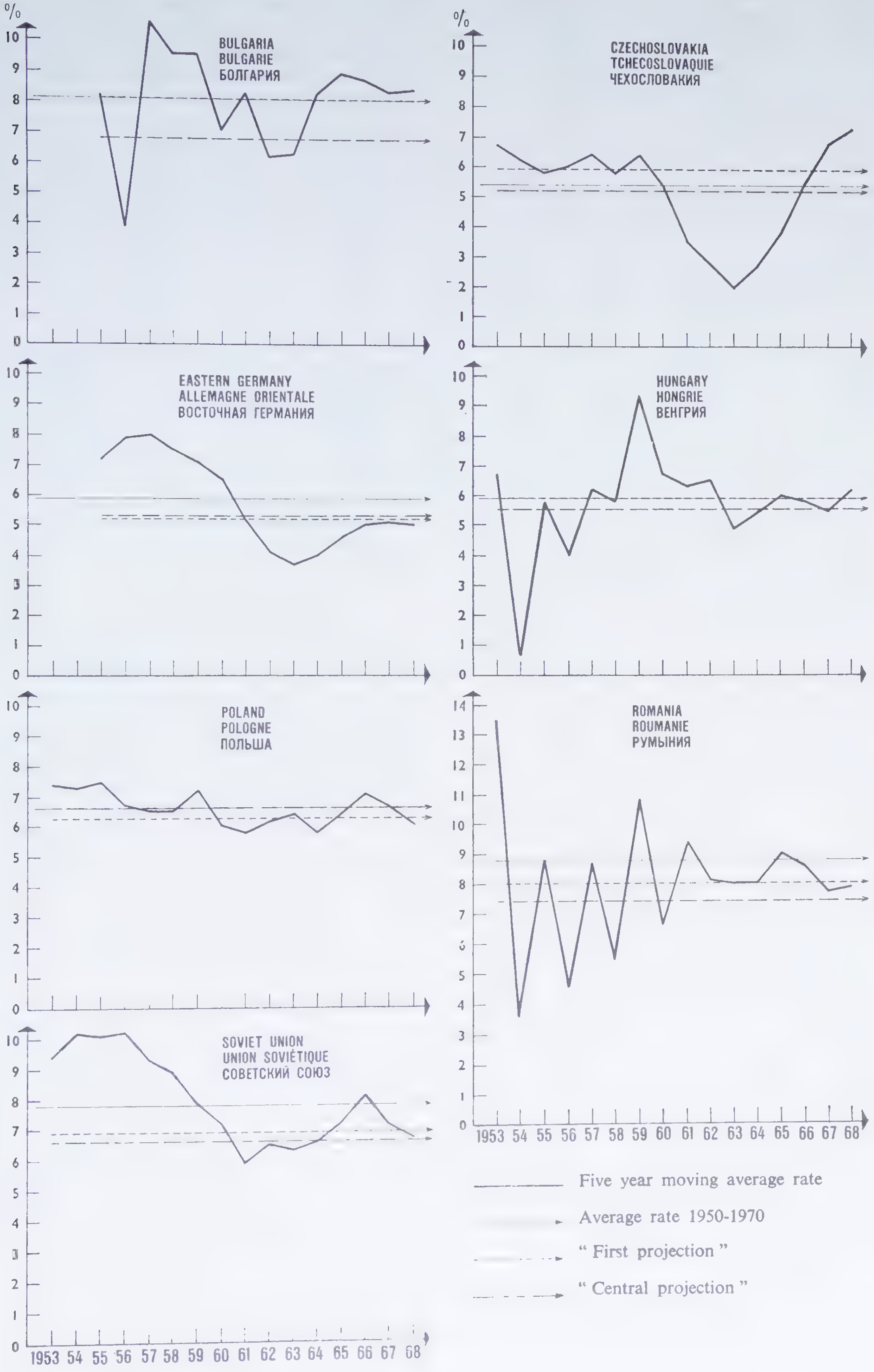


Table 2.16

" Expected " and actual distribution of labour force by major sectors, 1950 and 1967

Country	Industry and construction			Agriculture and forestry			Services		
	Expected	Actual	Difference	Expected	Actual	Difference	Expected	Actual	Difference
				1950					
Bulgaria [a]	18.5	16.0	−2.5	55.5	69.7	14.2	26.0	14.3	−11.7
Czechoslovakia	29.5	36.3	6.8	35.2	38.6	3.4	35.3	25.1	−10.2
Eastern Germany [a]	27.3	47.4	20.1	39.7	21.8	−17.9	33.0	30.8	−2.2
Hungary	23.0	23.7	0.7	47.6	50.1	2.5	29.4	26.2	−3.2
Poland	22.0	22.5	0.5	49.3	56.5	7.2	28.7	21.0	−7.7
Romania [b]	13.2	15.0	1.8	64.6	73.5	8.9	22.2	11.5	−10.7
Soviet Union	20.7	27.5	6.8	51.6	48.8	−2.8	27.7	23.7	−4.0
				1967					
Bulgaria	33.8	36.3	2.5	26.8	41.0	14.2	39.4	22.7	−16.7
Czechoslovakia	39.3	46.7	7.4	16.7	19.9	3.2	44.0	33.4	−10.6
Eastern Germany	39.7	47.8	8.1	15.9	15.3	−0.6	44.4	36.9	−7.5
Hungary	35.1	39.2	4.1	24.8	30.0	5.2	40.1	30.8	−9.3
Poland	34.5	31.6	−2.9	26.0	41.7	15.7	39.5	26.7	−12.8
Romania	30.1	26.8	−3.3	34.1	54.6	20.5	35.8	18.6	−17.2
Soviet Union	36.4	35.2	−1.2	22.5	30.5	8.0	41.1	34.3	−6.8

[a] 1952. [b] 1951.

Table 2.17

" Expected " and actual distribution of GDP by sectors in current and 1963 prices, 1950 and 1967

Country	Industry and construction					Agriculture					Services				
		Actual		Deviation			Actual		Deviation			Actual		Deviation	
	Expected	Current prices	1963 prices	Current prices	1963 prices	Expected	Current prices	1963 prices	Current prices	1963 prices	Expected	Current prices	1963 prices	Current prices	1963 prices
								1950							
Bulgaria [a]	28.5	37.8	22.9	9.0	−5.6	29.8	24.0	39.7	−5.8	9.9	41.8	38.2	37.4	−3.6	−4.4
Czechoslovakia	35.9	58.4	39.2	22.5	3.3	18.3	14.5	25.0	−3.8	6.7	45.8	27.1	35.8	−18.7	−10.0
Eastern Germany	34.3	50.9	41.0	16.3	6.7	20.5	8.3	14.0	−12.2	−6.5	45.2	40.8	45.0	−4.4	−0.2
Hungary	31.5	39.0	32.4	7.3	0.9	24.9	18.6	24.3	−5.9	−0.6	43.6	42.4	43.3	−1.4	−0.3
Poland	30.9	43.1	29.5	12.2	−1.4	25.8	22.3	30.4	−3.5	4.6	43.3	34.6	40.1	−8.7	−3.2
Romania	24.8	..	22.3	..	−2.5	36.0	..	39.9	..	4.2	39.5	..	37.8	..	−1.7
Soviet Union	29.9	(46.5)	33.3	(16.6)	3.4	27.5	21.9	27.8	(−5.6)	0.3	42.6	31.6	38.9	−11.0	−3.7
								1967							
Bulgaria	39.0	46.6	47.0	7.7	8.0	14.8	25.7	23.3	10.9	8.5	46.2	27.7	29.7	−18.6	−16.5
Czechoslovakia	42.7	57.8	57.5	15.1	14.8	10.2	9.4	8.1	−0.8	−2.1	47.1	31.8	34.4	−15.3	−12.7
Eastern Germany	43.0	53.8	54.0	10.8	11.0	9.8	11.2	7.3	1.4	−2.5	47.2	35.0	38.7	−12.2	−8.5
Hungary	39.6	51.9	54.0	12.4	14.4	14.2	16.4	11.5	2.3	−2.7	46.2	31.7	34.5	−14.8	−11.7
Poland	39.3	49.4	48.2	10.1	8.9	14.4	18.5	15.0	4.1	0.6	46.3	32.1	36.8	−14.2	−9.5
Romania	36.3	..	53.6	..	17.3	17.7	..	21.8	..	4.1	46.0	..	24.6	..	−21.4
Soviet Union	40.8	48.7	50.2	7.9	9.4	12.7	17.8	14.6	5.1	1.9	46.5	33.5	35.2	−13.0	−11.3

[a] 1952.

of ensuing difficulties as the distribution of national income was heavily weighted in favour of investment, stock formation and non-consumption expenditure, the structure of investment heavily oriented in favour of heavy industry and the efficiency of the system suffered greatly from a number of side-effects produced by the given growth pattern, even moderate improvements, whether expressed in a more balanced distribution of resources or in the development of the institutional structure, brought highly beneficial results. Also of help was the delayed effect on output of earlier investment in long-maturing projects as they became operational, and as past outlays on raising educational levels and professional skills of the labour force began bearing fruit.

Among the factors tending to mitigate the situation in this period, of particular importance in a number of countries were the still largely untapped possibilities of raising agricultural production. This was particularly true for the Soviet Union, where the development of virgin lands and other measures taken to overcome stagnation resulted in an expansion of agricultural output that was fast enough to compensate to a large extent for the slow-down in the industrial sector.[34] This factor also carried great weight in Poland where the relatively fast growth in the mid-1950s (indicated in the chart) would not have been possible had it not been for the upswing in agriculture which took place at that time.

It is less easy to identify the factors which have been mainly responsible for the swings in the trend during the 1960s. In the late 1950s a new investment drive occurred in most countries, bringing with it new bottlenecks, while the beneficial effect of most of the factors previously mentioned became exhausted. Other elements certainly played a particularly important role in some countries, among them the disruption of trade with mainland China. It would seem, however, that whatever the importance of such factors it was the intensity of the development drive in the years 1958-1960 which conditioned the slump in the growth rate in the early 1960s.

The downturn was halted around 1963 and the ensuing recovery once again brought growth rates to a significant level. As in the corresponding period of the previous swing, special factors can be found which may have helped in this direction. One of these, apparently, was the entry of the post-war generation into the labour force. Another was the initial impact of the economic reforms, which in some cases was very significant. But whatever the reasons, growth rates around 1966 were in most cases almost equal to those around 1959, eastern Germany and Hungary being the only significant exceptions.[35]

Since the 1967 and 1968 points plotted on the chart are partly obtained on the basis of projected developments in 1969 and 1970, it may seem somewhat premature to advance any final judgement as to the direction in which growth rates are presently moving. It would appear, nonetheless, that since about 1966 the trend has turned down in most countries.

An important point emerging from the preceding discussion is that the slowing down mentioned above (see discussion of trend values on p. 14) has been far from steady and that growth rates have, indeed, exhibited an ability to recover and to attain levels almost equal to those enjoyed at previous peaks; this took place in a number of cases. It is in the light of this tendency that particular care must be taken when mapping out the direction of future movements.

(ii) A " first working variant " for 1980

Several indices might be considered as a basis for projecting future trends. In the first place, there are available the indices of NMP measuring the average " historical " growth rate: one estimated over the whole of the period 1950-1970, the other covering the period 1950-1967. The advantage of the former is that it incorporates the maximum information and that of the latter that it covers what amounts to practically two full swings (i.e. 1950-1958 and 1958-1966) of economic development. Both indices are greatly influenced by developments which are historically rather distant and accordingly may tend to reflect insufficiently the " current " direction of the trends in the growth rate.

Then there is the experience of the relatively high rates bracketing the comparatively recent 1958-1966 period. These " best " rates are apparently indicative of the level to which the growth rate may be pushed for short periods of time, its sustainment being difficult over longer periods. From the point of view of long-term possibilities, an average estimated over the whole 1958-1966 period may well be a more realistic basis for projection than the " best " rates. However, such an average also has a serious inadequacy: its use would implicitly assume that differences between countries in the amplitude of the 1963 slow-down will determine to a large extent the differentiation of future growth rates. The 1965 " trend " values are also in certain cases influenced by the amplitude of the 1963 swing, the trend rate for Czechoslovakia apparently being particularly understated. For reasons relating to the mathematical properties of the curve fitted as a trend line, the figure for Hungary, on the other hand, would seem to be overstated.

Finally, an average estimated over the period 1966-1970 might also be utilized. While most " forward looking ", the " present " rate suffers from the fact that it covers a relatively short period of time the positioning of which, relative to the trend movement, is not very clear.

---

[34] It must be noted that developments in the Soviet Union in this period were not exactly comparable to those in other countries, owing to the much longer history of centralized development planning.

[35] For Hungary, however, the comparison is somewhat misleading. The growth level in the period around 1959, in addition to reflecting the development already described, also incorporated the effect of recovery from the 1956 events and possibly also from the more distant (but sharper than in other countries) slowing down in 1954 which was also partly due to special circumstances.

An improvement on this is provided by the " receding weight average "[36] which, together with some of those previously mentioned, is shown in the text-table below. One characteristic of this index is that it is also " forward looking ". With recent years receiving an arithmetically progressively higher weight, only 17 per cent of the index is determined by developments in the years 1950 through 1958 forming the first development period. The rest of the index represents about equally the weight of developments in the period 1958-1966 on the one hand, and those from 1966 to 1970 on the other, roughly an average of the second period and the present rate. As can be seen from the table, the effect of the extension of the period for which the index is estimated is, nonetheless, to smooth out differences between countries, both in the " present " rate and in the average 1959-1966 rate, which may be taken to be due to specific developments in the years considered. Thus, for instance, for Czechoslovakia and Hungary the " receding weight average " rate is significantly lower than the " present " rate which, in the case of Czechoslovakia at least, apparently reflects the impact of the recovery from the slump in the growth rate around 1963, which was larger than in any other country. The opposite is true for the Soviet Union and to a lesser extent for Romania, where the present rate is even lower than the average for the period mentioned. While possibly reflecting a tendency towards retardation —stronger than in the other countries—it is also possible that the relatively low growth rates recorded in these countries in the present quinquennium are a reflexion of either a somewhat earlier or a steeper downswing in the growth rate (owing to temporary factors), in which case the " receding weight average " index may well provide a firmer basis for projection.

Growth rates of NMP

	" Peak rates " [a] around 1959	" Peak rates " [a] around 1966	Average rate 1959-1966 [b]	" Trend rate " 1965 [c]	" Present rate " 1966-1970	" Receding weight average " rate
Bulgaria	9.6	8.8	7.9	8.1	8.4	8.0
Czechoslovakia	7.4	6.8	4.3	3.8	7.3	5.3
Eastern Germany	6.3	6.0	5.1	4.5	5.1	5.3
Hungary	9.8	5.7	6.3	6.3	6.4	5.7
Poland	7.2	6.9	6.3	6.2	6.2	6.3
Romania	10.8	9.0	8.6	7.7	8.1	8.1
Soviet Union	8.8	8.1	7.2	7.0	6.6	7.1

[a] Five-year average centred on one of the years 1958-1960 and 1965-1967, whichever is the highest.

[b] Average of five-year averages of the period between the years used for columns 1 and 2.

[c] See p. 14 and table 2.8.

When extrapolating the growth rate on the basis of the " receding weight average ", past as well as current tendencies in each country are taken into consideration. Each country's own experience is weighted independently of the experience of the group as a whole. A second approach might be to use such common patterns of development as can be found within the group as a whole. This is on the assumption that in the long run the experience of the various countries tend to converge towards a common pattern, and that the relationship found between growth rates of the various countries and their per capita GDP level is itself a reflection of this pattern.

In the first section of this chapter a fairly high degree of correspondence was found between NMP growth rates and relative GDP per head levels. It is more difficult to find a satisfactory way of expressing this relationship in analytical form. Of the various equations which seem appropriate for this purpose, the following three give the best results:

$$Y = 4.304 + 934.153 \frac{1}{X} \quad (r = 0.71,\ \sigma = 0.91) \qquad [2.1]$$

$$Y = 8.741 + 40.269 \frac{1}{\log X} \quad (r = 0.76,\ \sigma = 0.84) \qquad [2.2]$$

$$\log Y = 0.6559 + 64.03 \frac{1}{X} \quad (r = 0.73,\ \sigma = 0.96) \qquad [2.3]$$

where Y = least squares annual growth rate of NMP
X = calculated GDP per head in 1950 in " average " 1963 United States dollars
r = the index of correlation
σ = standard error of Y estimate.

None of the equations provides an estimate that is precise enough to serve as more than a general indication of the implied tendencies. Nonetheless, using equation [2.2] which gives the relatively best approximation, the following growth rates can be estimated as corresponding to the 1965 GDP per capita levels:

	GDP per capita in 1965 [a]	Growth rate yielded by equation [2.2]
Bulgaria	775	5.2
Czechoslovakia	1 240	4.3
Eastern Germany	1 348	4.1
Hungary	870	5.0
Poland	870	5.0
Romania	627	5.7
Soviet Union	969	4.7

[a] Calculated figures in " average " 1963 prices expressed in dollars.

The magnitudes presented, together with the " historical " average growth rates, may well be regarded as the limits within which the future growth rates of NMP may be found. By averaging the two figures, an alternative working variant can be derived as follows:

	NMP growth rate		
	Geometric average 1950-1967	Growth equation [2.2]	Alternative working variant
Bulgaria	8.0	5.2	6.6
Czechoslovakia	5.2	4.3	4.8
Eastern Germany	6.1	4.1	5.1
Hungary	5.8	5.0	5.4
Poland	6.7	5.0	5.9
Romania	8.3	5.7	7.0
Soviet Union	8.2	4.7	6.4

---

[36] i.e. a weighted average of annual changes, weighting year 1 by 1, year 2 by 2, etc.

It must, of course, remain a matter of judgement, whether the " receding weight average " rate or the figures just derived provide a better starting point for a projections exercise. A pragmatic advantage of the " receding weight averages " method is that it yields higher estimates, thus reducing the danger of under-estimating future growth possibilities. This method is therefore used here on the assumption that any lack of realism will come to light when the consistency of the projected growth figures is tested against various inter-dependencies.

Thus, by applying the " receding weight average " rate to the 1970 figures, the first projection of the NMP for 1980 is obtained. In order to derive GDP figures as a first approximation, an assumption is made that the average growth rate of GDP will be three tenths of a percentage point lower than the NMP average growth rate. The results of the calculations—the growth of GDP shown also on a per capita basis using population projections as published in the *Economic Survey of Europe in 1968*, chapter III table 1 (slightly revised in the light of actual developments in the period 1965-1968)—are provided in the table below.

Average annual growth rates

	NMP	*GDP*	*Population*	*Per capita GDP*
	1970-1980	*1970-1980*	*1970-1980*	*1970-1980*
Bulgaria	8.0	7.7	0.7	7.0
Czechoslovakia	5.3	5.0	0.6	4.4
Eastern Germany	5.3	5.0	0.2	4.8
Hungary	5.7	5.4	0.4	5.0
Poland	6.3	6.0	1.1	4.9
Romania	8.1	7.8	0.9	6.9
Soviet Union	7.1	6.8	1.0	5.8
	1965-1980	*1965-1980*	*1965-1980*	*1965-1980*
Bulgaria	8.1	7.8	0.7	7.1
Czechoslovakia	5.9	5.6	0.6	5.0
Eastern Germany	5.2	4.9	0.2	4.7
Hungary	5.9	5.6	0.3	5.2
Poland	6.2	5.9	1.0	4.9
Romania	8.0	7.7	0.8	6.8
Soviet Union	6.9	6.6	1.0	5.5

It remains to be considered how the rates derived here tally with national plans or similar officially or semi-officially elaborated figures concerning the expected growth rate until 1980. At the time of preparation of this chapter, such figures were available for five countries. According to the Bulgarian long-term plan, the growth rate of the NMP will amount to an average of 8.1 per cent between 1965 and 1980, which is exactly the figure underlying the estimates shown in the table. According to official estimates, the NMP in Czechoslovakia will grow at a rate of 5.0 per cent between 1970 and 1980, that is 0.3 percentage points less than the figure shown here. In Hungary, according to preliminary working assumptions, NMP is to rise at a rate of 5.4 per cent between 1965 and 1985—i.e. 0.3 per cent less than the figure shown in the table. In Poland, a projection dating back somewhat earlier (around 1966)—also prepared by the Planning Office—foresaw an annual increase of the NMP of 6.0 per cent between 1965 and 1980; this is also somewhat lower than the figure shown here. The directives concerning the Romanian 1971-1975 Five-year Plan stipulate an average annual growth rate of the NMP of 7.7 to 8.5 per cent, while the guidelines for the development of the economy until 1980 foresee the doubling of the 1970 NMP, implying an annual growth rate of 7.2 per cent. The estimate shown in the above table is exactly in the middle of the range given in the directives for the next Five-year Plan, while it is higher than the official figure for the period 1970-1980. Thus, the variant considered here remains well within the upper range of any development goals which can reasonably be expected to guide planners and policy-makers in making their development decisions.

(iii) Projection of the sectoral growth-pattern of output

So far production has been projected on the assumption that changes in output of particular sectors are interdependent, not only in the sense of being determined by the pattern of demand and technical relationships of production, but also in the sense of availability of factor supplies. For instance a higher increase in industrial production can be achieved at a cost of a relatively lower expansion of agricultural output, and vice-versa. Following the same assumptions, a disaggregation of the total into major sectoral groups is attempted with a view to providing a more detailed picture of the conditions in which the growth rates might be realized. This should also provide a more convenient basis for testing a number of structural relationships which may be obtained in a given growth pattern.

There are at least three paths which can be followed at this stage in order to arrive at an evaluation of the pattern of sectoral growth:

(*a*) One may follow a purely extrapolatory procedure based on past and current relationships.

(*b*) One may view the growth of certain sectors as being autonomously given, that of others as being governed by technical relationships. The growth of the residual sector is then determined by taking into account over-all growth and the growth of the specified sectors.

(*c*) One may apply " comparative interpolation ", i.e. look for experience elsewhere (that is, if such experience lends itself to general interpretation).

It would appear that the procedure mentioned under (*a*) above is not easily adaptable to the problem at hand. Average past relationships are obviously poorly suited to the task of expressing future growth conditions, and the influence of policies (especially in view of the historically unique period of industrialization), and " current " trends in relative sectoral growth rates —like the over-all growth rate itself—are both influenced by factors of a rather short-term nature. At best, " historical " and " current " relationships are useful as a basis for comparison, thus helping to evaluate the scope of the implied changes.

TABLE 2.18

“ Expected ” and actual relative product per worker by sectors, current and 1963 prices, 1950 and 1967 [a]

	Industry and construction			Agriculture and forestry			Services		
		Actual			Actual			Actual	
Country	Expected	Current prices	1963 prices	Expected	Current prices	1963 prices	Expected	Current prices	1963 prices
					1950				
Bulgaria [b]	1.54	2.36	1.43	0.54	0.34	0.57	1.61	2.67	2.62
Czechoslovakia	1.22	1.61	1.08	0.52	0.38	0.65	1.29	1.08	1.43
Eastern Germany [b]	1.26	1.07	0.86	0.52	0.38	0.65	1.37	1.32	1.46
Hungary	1.37	1.65	1.37	0.52	0.37	0.49	1.48	1.62	1.65
Poland	1.40	1.92	1.31	0.52	0.39	0.54	1.51	1.65	1.91
Romania [c]	1.88	—	1.49	0.55	—	0.53	1.78	—	3.29
Soviet Union	1.44	1.69	1.21	0.53	0.45	0.57	1.54	1.33	1.64
					1967				
Bulgaria	1.15	1.28	1.29	0.55	0.63	0.57	1.17	1.22	1.31
Czechoslovakia	1.09	1.24	1.23	0.61	0.47	0.41	1.07	0.95	1.03
Eastern Germany	1.08	1.13	1.13	0.62	0.73	0.48	1.06	0.95	1.05
Hungary	1.13	1.32	1.38	0.57	0.55	0.38	1.15	1.03	1.12
Poland	1.14	1.56	1.53	0.55	0.44	0.36	1.17	1.20	1.38
Romania	1.21		2.00	0.52		0.40	1.28		1.32
Soviet Union	1.12	1.38	1.43	0.56	0.58	0.48	1.13	0.98	1.03

[a] Corresponding to GDP coverage. [b] 1952. [c] 1951.

The method mentioned under (*b*) above has an important advantage over that mentioned under (*c*), particularly in the case of the centrally planned economies, namely that it provides more room for policy oriented development patterns. However, no sector can be developed independently of others, and it may be argued that—at least where broad sectors such as industry, agriculture, etc. are concerned—the element of complementarity rather than of substitutability plays the dominant role, at least in the long run. It is for this reason that “ comparative interpolation ”, even if involving countries with a different institutional set-up, may be considered as providing a useful tool for this purpose as well.

The growth of agriculture, construction and material services is projected independently as follows:

(a) *Agriculture:* on the assumption that gross agricultural output will grow in accordance with preliminary estimates prepared by the FAO, slightly modified in the light of domestic targets and actual performance in the years 1965 to 1968,[37] and that the relationships between the growth of net and of gross output will continue as in the period from 1950 to 1967.[38]

(b) *Construction:* on the assumption that net output will grow at the same rate as gross output, increasing at a rate 10 per cent higher than the growth rate of NMP; the latter figure being derived on the basis of some considerations regarding investment rates and the required share of construction in total investment.

(c) *Material services:* on the assumption that they will expand at a rate similar to the NMP, taking into consideration past relationships and the need in most countries to accelerate the growth of this sector.

The projection of industrial output follows from these independent projections for other sectors (regarded as largely decided by policy), given the previously determined growth rate of aggregate output.

The results of the calculations, given in table 2.19, show the sectoral growth pattern of NMP obtained

TABLE 2.19

Sectoral growth pattern of the NMP, “ First projection ”, 1965-1980

Country	NMP total	NMP less agriculture	NMP less agriculture			Agriculture
			Industry	Construction	Other	
Bulgaria	8.1	9.7	10.3	8.9	8.1	2.4
Czechoslovakia	5.9	6.5	6.6	6.5	5.9	−1.0
Eastern Germany	5.2	5.6	5.7	5.7	5.2	0.4
Hungary	5.9	6.6	6.7	6.5	5.9	0.4
Poland	6.2	7.1	7.4	6.8	6.2	1.5
Romania	8.0	9.4	9.8	8.8	8.0	2.3
Soviet Union	6.9	7.7	7.9	7.6	6.9	2.6

---

[37] These FAO figures were designed to apply to the period from 1965 to 1975. Since the increase in demand for agricultural products may be assumed to slow down at higher income levels, the FAO tentative estimates taken to apply to the year 1980 would seem to incorporate an upward bias. The projected average annual growth rates are as follows: Bulgaria 3.4; Czechoslovakia 1.8; Eastern Germany 1.1; Hungary 1.9; Poland 2.4; Romania 2.8; Soviet Union 3.0.

[38] With the exception of Czechoslovakia, for which the assumption is made of a smaller decrease in net output than before for a corresponding rise in gross output.

from the "first projection". In evaluating sectoral proportions, the ratio of GDP growth to industrial growth is of particular importance. As can be seen from the figures below, the assumed sectoral pattern implies a rise in this ratio everywhere. The projected increase is rather uneven, the tendency being to reduce the existing variation mainly because of a relatively higher increase in the ratio of the two countries which are, industrially, least developed—Bulgaria and Romania. Nevertheless these two countries, joined by Poland, would continue to have the relatively lowest ratio.

GDP and NMP growth rate as a proportion of the industrial growth rate

	1950-1965 [a]		Projected 1965-1980	
	GDP	NMP	GDP	NMP
Bulgaria	.53	.56	.76	.79
Czechoslovakia	.67	.67	.85	.89
Eastern Germany	.73	.80	.86	.91
Hungary	.57	.65	.84	.88
Poland	.65	.72	.80	.84
Romania	.56	.61	.79	.82
Soviet Union	.72	.77	.84	.87

[a] Geometric growth rates.

How do the above changes compare with past trends ? With respect to the relation between industry and NMP, the relevant data are provided in table 2.20. It can be seen that the growth proportions between the two aggregates have tended to change from one period to another, even when the periods for which the averages are calculated are long enough to minimize the effect of short-term factors such as fluctuations in agricultural production. Generally speaking, there has been a tendency for the ratio of the NMP growth to industrial growth to increase over the long period. But the tendency for this ratio to vary inversely with the industrial growth rate is more important. Indeed, the following regression equations can be estimated on the basis of the data shown in the table:

$$(1)\ Y = 2.349 + 0.490\ X,\ (r = 0.82) \qquad [2.4]$$

$$\text{and } (2)\ C = 1.098 - 0.0314\ X,\ (r = 0.67) \qquad [2.5]$$

where Y represents the NMP growth rate

X represents the industrial growth rate

and C represents the ratio of the NMP to industrial growth.

A summary check of projected proportions against past relationships may be obtained from the above equations. As can be seen from the figures below, the projected NMP growth rates are everywhere somewhat higher in relation to the industrial rate than would appear from a combined time series/cross-country analysis of past relationships. Since this relationship was determined to a large extent by development policies which were similar in all countries, the difference between projected and past relationships can be taken to be indicative of the effect of the assumed policy-oriented shift towards a more balanced growth pattern.

Projected NMP growth rate, 1965-1980

	A	B	C
Bulgaria	8.1	7.4	7.7
Czechoslovakia	5.9	5.6	5.7
Eastern Germany	5.2	5.1	5.1
Hungary	5.9	5.6	5.8
Poland	6.2	6.0	6.3
Romania	8.0	7.2	7.5
Soviet Union	6.9	6.2	6.6

A = "First" projection variant.

B = Estimated using equation [2.4] and the projected industrial rate from variant A.

C = Estimated on the basis of equation [2.5] and the industrial rate projected from variant A.

TABLE 2.20

Rates of growth of NMP and of industry and growth ratios, various time intervals 1950-1967

Country and period	NMP	Industry	Ratio of NMP to industrial growth
Bulgaria			
1953-1957	8.2	15.9	0.52
1958-1962	7.8	13.0	0.60
1963-1967	9.0	11.7	0.77
Czechoslovakia			
1951-1955	6.7	9.0	0.74
1953-1957	5.8	7.2	0.81
1958-1962	5.4	8.6	0.63
1963-1967	3.8	3.8	1.00
Eastern Germany			
1953-1957	7.2	9.2	0.78
1958-1962	6.5	8.9	0.73
1963-1967	4.6	4.6	1.00
Hungary			
1951-1955	6.7	10.4	0.64
1953-1957	5.8	4.5	1.30
1958-1962	6.7	10.6	0.63
1963-1967	6.0	7.6	0.73
Poland			
1951-1955	7.4	12.2	0.60
1953-1957	7.5	9.7	0.78
1958-1962	6.0	8.8	0.68
1963-1967	6.4	7.9	0.81
Romania			
1951-1955	13.5	17.1	0.79
1953-1957	8.8	11.0	0.80
1958-1962	6.7	13.8	0.49
1963-1967	9.0	12.9	0.70
Soviet Union			
1951-1955	9.4	12.9	0.73
1953-1957	10.1	11.6	0.87
1958-1962	7.2	9.5	0.76
1963-1967	7.2	9.2	0.79

(iv) Projection of the size and distribution of the labour force

So far the discussion has concentrated on the growth and structure of NMP without considering the availability of input resources. The implied assumption was that the growth structure has no influence on the growth rate. This is clearly inadequate considering that input requirements differ in various sectors and that, therefore, with a given amount of resources, overall growth may be higher or lower depending on (*a*) how the resources are distributed among sectors and (*b*) the relative rate of expansion of sectoral productivity.

Only labour resources are considered in this exercise. The growth of labour resources is given exogenously. For this purpose variant I of the estimates prepared by the secretariat (*Economic Survey of Europe in 1968*, chapter III, table 8) is used. The variant is based on the projected distribution of the working-age population by age and sex, and the assumption that the age- and sex-specific activity rates prevailing in the last census will remain unchanged until 1980. The 1965 actual employment figures, the 1980 projection and a comparison of projected and past growth rates are given in the following table.

	Employment in thousands		*Annual percentage increase*	
	1965	*1980*	*1950-1965* [a]	*1965-1980*
Bulgaria	4 268	4 802	0.5 [b]	0.8
Czechoslovakia	6 477	7 287	1.0	0.8
Eastern Germany	8 070	8 570	0.2 [b]	0.4
Hungary	4 915	5 377	1.0	0.6
Poland	15 589	20 343	1.8	1.8
Romania	9 663	11 402	0.9 [c]	1.1
Soviet Union	103 620	133 460	1.9	1.7

[a] Geometric rate.

[b] 1952-1965.

[c] 1951-1965.

Thus, in most countries employment is foreseen to grow at nearly the same rate as in the past. The greatest difference, projected for Bulgaria and Hungary, amounts to 0.3 and 0.4 per cent respectively.

From the point of view of availability of labour supply, the scope for transferring labour out of agriculture is more significant than the increase in the total labour force.

Strictly speaking, in order to test the consistency of output projections with labour availabilities, a prognosis ought to be made of labour requirements under changing technological conditions in each branch and sector of activity. For agriculture, this would mean fixing the size of the agricultural labour force to be consistent with the projected level of output (and also, of course, with the projected level of agricultural technology). But even this approach would only have a limited degree of usefulness. Whatever may be the case in other sectors, the level of agricultural manpower is, in most countries, still determined by demographic factors on the one hand and the absorptive capacity of the non-agricultural sector on the other; only in the most developed countries have technological requirements begun to provide a barrier to the decline in agricultural employment.

Labour requirements per unit of output in agriculture, in addition to being influenced by soil and climatic conditions, are—as elsewhere—determined by the amount of capital per worker, technological standards, scale of production and a variety of other factors, and it is difficult to judge to what extent relative labour distributions indicate the existence of labour reserves in agriculture. Obviously, however, a percentage decline in the agricultural labour force in countries where its share in the total is high has greater significance in terms of the percentage increase in the supply of non-agricultural labour than in countries which already have only a low proportion of their labour force in agriculture. And, of course, such a percentage decline means, in absolute terms, a decreasing number of people leaving agriculture.

The relationships indicated may well be helpful in the search for some guide posts in mapping out future sectoral patterns. However, they provide little in terms of what might be used as a " working model " for the elaboration of such patterns. For instance, while it may be assumed that the future rate of withdrawal of labour from agriculture will somehow be related to the degree of availability of reserves in agriculture, it is difficult to define this relationship with any precisions. Inconsistencies soon appear, whether in relation to past trends or in relation to what may be realistically expected from present policies with respect to expansion of non-agricultural employment.

Under these conditions, it would appear that only two " mechanical " procedures can be followed in projecting relative rates of change between agricultural and non-agricultural employment. In alternative (A) the assumption is made that the agricultural labour force will continue to decline at a rate similar to the average for the period 1950-1965. As this does not appear to provide enough scope for reducing existing relative " labour reserves " in agriculture in a number of countries, another variant (B) will also be used incorporating the assumption that the decline in the proportion of the agricultural labour force between 1965 and 1980 will be—in terms of percentage points—equal to that which took place in the preceding fifteen-year period, subject to the constraint that the share of agriculture in total employment will not be lower than would be expected on the basis of the projected GDP per capita level in 1980 (as derived from regression analysis) plus or minus one-half of the deviation of actual from expected as observed in 1967.

The estimates are provided in table 2.21. The important feature which emerges is that even under what appears to be a maximum variant, until 1980 Poland and Romania will actually add to their relative agricultural labour reserves; for the lower variant this would also be true for Bulgaria and the Soviet Union.

Next, there is the problem of projecting employment in services. Decisions concerning the development of services (other than material services) extend into the socio-political sphere, and all one can do here is

TABLE 2.21

Employment in agriculture in 1965 and projection for 1980

Country	In thousands			Per cent of total			Growth rate		Deviation from " expected "	
		1980 Variants			1980 Variants		1965-1980 Variants		1980 Variants	
	1965	A	B	1965	A	B	A	B	A	B
Bulgaria	1 969	1 303	908	46.1	27.1	18.9	—2.7	—4.8	15.1	6.9
Czechoslovakia	1 366	866	758	21.1	11.9	10.4	—3.0	—3.8	3.1	1.6
Eastern Germany	1 301	818	668	16.1	9.5	7.8	3.0	—4.3	1.4	—0.3
Hungary	1 520	1 088	806	30.9	20.2	15.0	—2.2	—4.1	7.8	2.6
Poland	6 826	6 935	6 326	43.8	34.1	31.1	0.1	—0.5	22.5	19.5
Romania	5 550	4 912	4 709	57.4	43.1	41.3	—0.8	—1.1	28.4	26.6
Soviet Union	32 900	28 327	19 752	31.8	21.4	14.8	—1.0	—3.3	11.0	4.6

Variant A = " Low " variant derived on the assumption that employment in agriculture will decline at a rate similar to the average of the period 1950-1965.

Variant B = " High " variant derived on the assumption that the decline in the proportion of the agriculture labour force will be — in terms of percentage points — equal to that which took place in the period 1950-1965.

TABLE 2.22

Employment in services (excluding material) 1965 and various projections for 1980

Country	In thousands					Per cent of total labour force					Annual per cent growth rate			
		1980 variants					1980 variants				1965-1980 variants			
	1965	AA	BB	AB	BA	1965	AA	BB	AB	BA	AA	BB	AB	BA
Bulgaria	535	814	1 065	910	906	12.5	17.0	22.2	19.0	18.9	2.8	4.7	3.6	3.6
Czechoslovakia	1 124	1 412	1 534	1 535	1 435	17.4	19.4	21.1	21.1	19.7	1.6	2.1	2.1	1.6
Eastern Germany	1 437	1 645	1 745	1 719	1 677	17.8	19.2	20.4	20.1	19.6	0.8	1.3	1.2	1.0
Hungary	860	1 086	1 264	1 175	1 158	17.5	20.2	23.5	21.9	21.5	1.6	2.6	2.1	2.0
Poland	2 167	3 316	3 998	3 792	3 467	13.9	16.3	19.7	18.6	17.0	2.9	4.2	3.8	3.2
Romania	913	1 441	1 716	1 643	1 485	9.4	12.6	15.0	14.4	13.0	3.1	4.3	4.0	3.3
Soviet Union	17 650	26 246	32 653	29 564	28 381	17.0	19.7	24.5	22.2	21.3	2.7	4.2	3.5	3.2

Derived on the following asumptions:

Variant AA: growth rate proportional to that of the non-agricultural labour force as obtained on the basis of variant A estimate of agricultural employment.

Variant BB: growth rate 30 per cent higher than the growth rate of the non-agricultural labour force as obtained on the basis of variant B estimate of agricultural employment.

Variant AB: growth rate 30 per cent higher than the growth rate of non-agricultural labour force as obtained on the basis of variant A estimate of agricultural employment.

Variant BA: growth rate proportional to that of the non-agricultural labour force as obtained on the basis of variant B estimate of agricultural employment

TABLE 2.23

Employment in material sector excluding agriculture, in 1965 and projection for 1980

Country	In thousands					Per cent of total labour force					Growth rates			
		1980 variants					1980 variants				1965-1980 variants			
	1965	AA	BB	AB	BA	1965	AA	BB	AB	BA	AA	BB	AB	BA
Bulgaria	1 764	2 685	2 829	2 589	2 988	41.4	55.9	58.9	53.9	62.2	2.8	3.2	2.6	3.6
Czechoslovakia	3 987	5 009	4 995	4 886	5 094	61.6	68.7	68.5	67.1	69.9	1.6	1.5	1.3	1.6
Eastern Germany	5 332	6 107	6 157	6 033	6 225	66.1	71.3	71.8	70.4	72.6	0.9	1.0	0.8	1.0
Hungary	2 535	3 203	3 307	3 114	3 413	51.6	59.6	61.5	57.9	63.4	1.6	1.8	1.4	2.0
Poland	6 596	10 092	10 019	9 616	10 550	42.3	49.6	49.2	47.3	51.9	2.9	2.8	2.5	3.2
Romania	3 200	5 049	4 977	4 847	5 208	33.2	44.3	43.7	42.5	45.7	3.1	3.0	2.8	3.3
Soviet Union	53 070	78 887	81 055	75 569	85 327	51.2	59.1	60.7	56.6	63.9	2.7	2.9	2.4	3.2

AA = Low agricultural shift, low increase in services.
BB = High agricultural shift, high increase in services.
AB = Low agricultural shift, high increase in services.
BA = High agricultural shift, low increase in services.

consider alternative growth patterns. Employment in services is projected on two assumptions: (*a*) that the growth rate will be proportional to that of the non-agricultural labour force, and (*b*) that the growth rate will be 30 per cent higher than the growth rate of the non-agricultural labour force. Four variants are thus obtained in connexion with the two variants of the agricultural and non-agricultural employment previously derived. The estimates are presented in table 2.22.

Employment in the non-agricultural "material" sector is obtained as a residual. As in the case of services, four variants are considered: one on the assumption of a smaller shift from agriculture and a smaller growth of employment in services; the second on the assumption of a larger decline in the agricultural labour force and larger increase in employment in services; the third on the assumption of a larger decline in the agricultural labour force and a smaller growth of employment in services; and the fourth on the assumption of a smaller shift of employment from agriculture and a larger increase of employment in services. The estimates are presented in table 2.23.

(v) Reconciliation with the output projections

The question then arises as to how the employment estimates, particularly in the material sector, excluding agriculture, tally with the projected output figures. In other words, what can be said of the feasibility of attaining productivity growth rates in this sector consistent with projected output and employment? The productivity growth rates needed to attain projected output growth and the comparable past average growth rates are shown in table 2.24.

It can be seen that in order to attain the projected growth rate of output in Bulgaria, Czechoslovakia, Hungary and Romania, a higher growth rate of labour productivity would be needed than has been, on the average, attained in the past. The opposite is true for eastern Germany, Poland and the Soviet Union.

It was brought out earlier that the tendency in most cases has been for labour productivity growth to decline over time.[39] These trends may be taken to a large extent to be a reflection of the trends in output. Although there is an association between the growth of output and growth of employment, not all of the changes in output can be explained by changes in employment. Considered in relation to the growth of output, the growth of labour productivity has been much more stable. And, while in some countries a certain deterioration in this relationship is apparent (i.e. the proportion of output growth which cannot be explained by the growth of employment), the decline has not been as general.

Using the relationship between the growth of output and of labour productivity, one may go a step further in testing the consistency of the output and employment projections. From the data provided in table 2.25 the following growth relationships can be estimated to have prevailed in the various countries:

Bulgaria
$E = -2.422 + 0.766\,O;$ $(r = 0.95)$
$P = 2.630 + 0.187\,O;$ $(r = 0.58)$

Czechoslovakia
$E = 1.507 + 0.123\,O;$ $(r = 0.75)$
$P = -1.488 + 0.852\,O;$ $(r = 0.99)$

Eastern Germany
$E = -0.433 + 0.084\,O;$ $(r = 0.31)$
$P = 0.438 + 0.917\,O;$ $(r = 0.96)$

Hungary[a]
$E = -2.579 + 0.732\,O;$ $(r = 0.90)$
$P = 2.809 + 0.221\,O;$ $(r = 0.52)$

Poland
$E = -0.480 + 0.436\,O;$ $(r = 0.65)$
$P = 0.818 + 0.506\,O;$ $(r = 0.70)$

Romania
$E = -3.696 + 0.788\,O;$ $(r = 0.79)$
$P = 4.095 + 0.152\,O;$ $(r = 0.23)$

Soviet Union
$E = 3.729 - 0.008\,O;$ $(r = 0.06)$
$P = -3.475 + 0.961\,O;$ $(r = 0.99)$

where E represents the employment growth rate,
O represents the output growth rate, and
P represents the output per man growth rate.

Both the size of the intercepts and the regression coefficients of these equations show a great deal of

---

[39] See page 12.

[a] Excluding the years 1954-1957 which were influenced by special factors or circumstances in some of these years.

TABLE 2.24

Projected growth of output,[a] employment and derived productivity

Country	Projected NMP less agriculture	Employment variants				Output per man				
						Required variants				Comparable past growth rates [b]
		AA	BB	AB	BA	AA	BB	AB	BA	
Bulgaria	9.7	2.8	3.2	2.6	3.6	6.7	6.3	6.9	5.9	4.6
Czechoslovakia	6.5	1.6	1.5	1.3	1.6	4.8	4.9	5.1	4.8	4.2
Eastern Germany	5.6	0.9	1.0	0.8	1.0	4.7	4.6	4.8	4.6	6.7
Hungary	6.6	1.6	1.8	1.4	2.0	4.9	4.7	5.1	4.5	3.7
Poland	7.1	2.9	2.8	2.5	3.2	4.1	4.2	4.5	3.8	5.2
Romania	9.4	3.1	3.0	2.8	3.3	6.1	6.2	6.4	5.9	5.6
Soviet Union	7.7	2.7	2.9	2.4	3.2	4.9	4.7	5.2	4.4	5.9

[a] First projection. See table 2.19. [b] Exponential rate 1950-1967.

variation. This may be taken to suggest that "growth efficiency" has been rather dissimilar at various growth levels in the different countries. The nature of these differences is more clearly seen in the following figures:

Estimated growth rate at output growth rate of:

	5 per cent	*10 per cent*
Bulgaria		
E	1.4	5.2
P	3.6	4.5
Czechoslovakia		
E	2.1	2.7
P	2.8	7.0
Eastern Germany		
E	0.0	0.4
P	5.0	9.6
Hungary		
E	1.0	4.7
P	3.9	5.0
Poland		
E	1.7	3.9
P	3.4	5.9
Romania		
E	0.2	4.2
P	4.9	5.6
Soviet Union		
E	3.7	3.7
P	1.3	6.1

Thus, for instance, at a 5 per cent expansion rate, "growth efficiency" (as measured by the proportion of increase in output which cannot be explained by employment growth) has been most pronounced in eastern Germany, Romania and Hungary, and relatively lowest in the Soviet Union. The picture is quite different at the 10 per cent growth level. Here, although eastern Germany still maintains the highest position, it is followed by Czechoslovakia and the Soviet Union. Bulgaria, Hungary and Romania take the lowest positions, clearly reflecting a much higher elasticity of growth of employment with respect to output, and a correspondingly much lower elasticity of growth of labour productivity.

In the light of these relationships, the question may be posed—what employment and productivity growth rates are consistent with the preliminary projections of the growth of output for the period 1965 to 1980 ? The answer is provided by the figures below. The second and third columns show the growth rates of employment and output per man in the period 1950-1965, as obtained from the above regression equations and using the geometric growth rates of output (column 1) during this period. The fifth and sixth columns show growth rates of employment and productivity as obtained by applying the regression equations to the growth rates of output projected for the period 1965-1980 (column 4).

NMP less agriculture

	1950-1965			*1965-1980*		
	O [a]	*E*	*P*	*O*	*E*	*P*
Bulgaria	10.7 [b]	5.8	4.6	9.7	5.0	4.4
Czechoslovakia	6.9	2.4	4.4	6.5	2.3	4.1
Eastern Germany	7.2 [b]	0.2	7.0	5.6	0.0	5.6
Hungary	7.5	2.9	4.5	6.6	2.3	4.3
Poland	9.1	3.5	5.4	7.1	2.6	4.4
Romania	11.2	5.1	5.8	9.4	3.7	5.5
Soviet Union	10.2	3.6	6.3	7.7	3.7	3.9

[a] Geometric growth rate. [b] 1952-1965.

It can be seen that, whereas in some countries the expected growth rates of labour productivity remain about the same as in the past, in others (owing partly to a high elasticity of productivity changes to output), the expected growth rates of labour productivity are much lower than previously experienced. The latter is particularly true for the Soviet Union where the expected growth rate of productivity is only about 3.9, as compared with a past average of 6.3 per cent. Another country in which a considerable deceleration in the productivity growth rate is to be expected on the grounds of the deceleration in the output rate is eastern Germany. In Bulgaria, Hungary and Romania, the impact of lower output growth may be expected to be borne by the decelerated growth of employment, and in Poland by a decrease of employment and productivity growth by about the same extent.

What is most important is that the data reveal a discrepancy between the employment and (implied) productivity growth rates so far projected, and the employment and productivity growth rates which are to be expected should there be a continuation of past relationships between the growth of output on the one hand and the growth of employment and productivity on the other. Thus, the equations yield growth rates of employment which are, in most cases, higher than those considered as alternative projections. They yield productivity growth rates which are generally lower than those which would be needed in order

TABLE 2.25

National income less agriculture: five-year moving average of yearly percentage change in output, employment and output per man

Country	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965
Bulgaria													
National income			10.1	8.7	11.8	13.9	13.2	12.1	11.5	8.8	8.7	9.6	10.8
Labour force			5.0	4.8	6.2	8.0	8.2	7.1	6.9	4.9	3.8	4.6	5.2
Output per man			4.9	3.6	5.1	4.5	4.6	4.6	4.3	3.8	4.7	4.7	5.4
Czechoslovakia													
National income	10.0	8.5	7.5	8.1	8.2	7.8	8.3	7.5	4.9	3.6	3.2	3.4	4.0
Labour force	2.6	2.3	2.5	2.5	2.3	2.7	2.7	2.6	2.4	2.3	1.9	1.7	1.5
Output per man	7.1	6.0	4.8	5.4	5.8	5.0	5.4	4.7	2.4	1.2	1.2	1.6	2.5
Eastern Germany													
National income			8.7	9.5	9.5	8.2	8.2	7.6	5.9	4.6	4.1	4.1	4.6
Labour force			1.2	0.9	0.1	0.1	−0.0	−0.6	−0.7	−0.4	0.0	0.3	0.6
Output per man			7.4	8.6	9.4	8.1	8.3	8.3	6.6	5.0	4.1	3.8	4.0
Hungary													
National income	8.4	2.8	4.4	4.6	6.9	8.4	12.0	9.6	8.7	8.9	6.5	6.5	7.1
Labour force	5.9	4.0	3.0	2.9	3.0	3.4	3.8	3.8	3.5	3.1	2.7	2.6	2.5
Output per man	2.3	−1.2	1.3	1.6	3.7	4.7	8.0	5.6	5.1	5.6	3.7	3.8	4.5
Poland													
National income	11.2	9.9	9.6	8.2	8.5	8.4	8.8	8.4	7.7	7.5	7.8	7.5	7.2
Labour force	4.9	4.0	4.0	3.1	3.2	2.4	2.3	2.4	2.9	2.5	3.4	3.5	3.4
Output per man	6.0	5.7	5.3	5.0	5.1	5.8	6.3	5.9	4.7	4.9	4.3	3.9	3.7
Romania													
National income		8.7	8.9	7.6	8.7	8.2	10.5	10.8	11.5	12.6	11.8	10.5	10.7
Labour force		5.5	3.7	2.3	1.6	2.2	3.4	4.9	6.1	6.2	5.7	4.9	4.2
Output per man		3.0	5.0	5.3	7.0	5.9	6.9	5.7	5.1	6.0	5.8	5.5	6.3
Soviet Union													
National income	12.6	11.6	11.7	11.2	10.5	10.3	9.8	8.8	8.3	7.6	7.8	7.8	8.5
Labour force	3.5	3.7	3.6	3.6	3.4	3.9	3.8	3.9	3.8	3.1	3.9	3.6	3.7
Output per man	8.8	7.6	7.8	7.3	6.9	6.2	5.7	4.8	4.3	4.4	3.8	4.1	4.7

TABLE 2.26

Consistency of various employment and productivity estimates

(NMP less agriculture)

Country	Labour productivity " needed " various variants				From equations		Employment " projected " various variants			
	AA	*BB*	*AB*	*BA*			*AA*	*BB*	*AB*	*BA*
Bulgaria	6.7	6.3	6.9	5.9	4.4	5.0	2.8	3.2	2.6	3.6
Czechoslovakia	4.8	4.9	5.1	4.8	4.1	2.3	1.6	1.5	1.3	1.6
Eastern Germany	4.7	4.6	4.8	4.6	5.6	0.0	0.9	1.0	0.8	1.0
Hungary	4.9	4.7	5.1	4.5	4.3	2.3	1.6	1.8	1.4	2.0
Poland	4.1	4.2	4.5	3.8	4.4	2.6	2.9	2.8	2.5	3.2
Romania	6.1	6.2	6.4	5.9	5.5	3.7	3.1	3.0	2.8	3.3
Soviet Union	4.9	4.7	5.2	4.4	3.9	3.7	2.7	2.9	2.4	3.2

to attain the projected growth of output with the projected growth of employment. Exceptions to this are eastern Germany and Poland, as can be seen more clearly from table 2.26.

(vi) Alternative projections

The preceding discussion indicates that the output projections derived by the methods described above cannot generally be regarded as realistic unless extreme assumptions are made about the elasticity of labour supply for the non-agricultural material sectors. In the present section, an attempt is made to derive, in the light of the previous discussion, a more realistic set of projections, one of which is to serve as a " central " projection. This will be accompanied by some further consideration of the factors influencing productivity growth in the non-agricultural material sectors. The hypothesis about agricultural output, and the alternative assumptions about the size and distribution of the labour force, already described, are retained.

The major question to be resolved is whether one can reasonably retain the projections of productivity in spite of the deficiency of labour supply to meet the first set of output projections. It has been shown that the elasticity of productivity growth with respect to output growth has been rather high in some countries.[40]

The relationships so far considered between output, employment and productivity growth are based upon output as the independent variable. Since there is a determined interrelationship between the two regression equations involved in each case, the significance of the correlation between output and any of the other two variables is dependent not only on the size of the coefficient measuring this correlation but also on the correlation coefficient from the other equation. Thus, for example, the statement that in eastern Germany a growth rate of output of 5 per cent can be expected to be associated with virtually no increase in employment appears to be true not because the equation involved " explains " a great deal of the variations in employment growth by variations in output growth, but from the corollary equation relating the growth of productivity to that of output.

On the other hand, the fact that in most countries one or other of the equations commands a low correlation coefficient may be taken to indicate that there is rather an insignificant correlation between employment and productivity growth. In fact, if the latter relationship is analysed directly the following results are obtained:

Bulgaria $P = 3.986 + 0.114\ E; \quad (r = 0.28)$
Czechoslovakia $P = -4.004 + 3.505\ R; \quad (r = 0.66)$
Eastern Germany $P = 6.680 + 0.078\ E; \quad (r = 0.02)$
Hungary $P = 6.042 - 0.354\ E; \quad (r = -0.23)$
Poland $P = 5.422 - 0.093\ E; \quad (r = -0.09)$
Romania $P = 6.788 - 0.275\ E; \quad (r = -0.42)$
Soviet Union $P = 11.091 - 1.427\ E; \quad (r = -0.20)$

where P and E are as on page 34.

In the absence of any clear-cut correlation between the growth rate of employment and that of labour productivity, one is compelled to conclude that, whereas according to past experience lower growth rates of output were generally accompanied by lower growth rates of labour productivity and employment, a reduction in the growth rate of employment does not necessarily lead to a reduction in the growth rate of labour productivity or even output. The implication of an error in the labour productivity projection which is obtained when the growth of output is assumed to be the determining variable is not sustained when the growth of employment is taken to play the strategic role.

Moreover, the productivity projections so far considered represent essentially extrapolations of past trends in each of the countries considered. If one is to envisage changes in these trends, it is very likely that a country such as Bulgaria, whose past " growth efficiency " has been significantly below average, will improve its performance, whereas a country such as eastern Germany, whose " growth efficiency " has been much above the others will, owing to a greater availability of labour, experience a certain deterioration in the relationship between productivity and employment growth. In effect, what is likely is that the relationships in the different countries will move closer to those which have characterized the group considered as a whole.

Using table 2.25 the following equations can be derived illustrating " average " relationships between the growth of output, employment and output per man in the group as a whole:[41]

$$E = -1.757 + 0.575\ O; \quad (r = 0.72)$$
$$P = 1.904 + 0.389\ O; \quad (r = 0.56)$$

The labour productivity and employment growth figures obtained from these equations, which are comparable to those previously derived on the basis of the equations pertaining to the individual countries (columns 5 and 6 of table 2.26), are as follows:

	E	*P*
Bulgaria	3.8	5.7
Czechoslovakia	2.0	4.4
Eastern Germany	1.5	4.1
Hungary	2.0	4.5
Poland	2.3	4.7
Romania	3.6	5.6
Soviet Union	2.7	4.9

Taking an average of the two productivity growth figures (i.e. assuming that the movement will be halfway towards the " model ") and combining it with the projected employment variants, one obtains the growth variants of output, productivity and employment for the period 1965-1980 shown in table 2.27.

Proceeding in a similar way as in the case of the " first " projection variant, the sectoral growth rates are derived. These—as well as growth rates of NMP—are given in table 2.28.

For the derivation of GDP growth rates, one can now use the employment estimates for the service sector (excluding material) as shown in table 2.22. As before, the growth of output of this sector is estimated on the assumption that the growth rate of productivity of labour will amount to one per cent per year.

---

[40] This is particularly important for Czechoslovakia and the Soviet Union and less so for eastern Germany and Poland. On the other hand, in Bulgaria, Hungary and Romania, the error can be estimated at only one-third of the error of the output projection. For instance, in Bulgaria a growth rate of output 30 per cent lower than that underlying the productivity projection (6.8 per cent instead of 9.7 per cent) might be expected on the basis of past relationships to be accompanied by a growth rate of labour productivity of 4.0 per cent instead of the projected 4.4 per cent.

[41] The Hungarian figures before 1960 are excluded from the regression equation since they represent five-year moving averages and are affected by developments in the years 1954-1957.

TABLE 2.27

Derivation of new output variants

(NMP less agriculture)

Country	Productivity	Employment Variants AA	Employment Variants BB	Employment Variants AB	Employment Variants BA	Output Variants AA	Output Variants BB	Output Variants AB	Output Variants BA
Bulgaria	5.0	2.8	3.2	2.6	3.6	7.9	8.4	7.7	8.8
Czechoslovakia	4.3	1.6	1.5	1.3	1.6	6.0	5.8	5.7	6.0
Eastern Germany	4.9	0.9	1.0	0.8	1.0	5.8	5.9	5.7	5.9
Hungary	4.4	1.6	1.8	1.4	2.0	6.1	6.3	5.9	6.4
Poland	4.5	2.9	2.8	2.5	3.2	7.5	7.4	7.1	7.8
Romania	5.5	3.1	3.0	2.8	3.3	8.8	8.7	8.4	9.0
Soviet Union	4.4	2.7	2.9	2.4	3.2	7.2	7.4	6.9	7.7

TABLE 2.28

Various projection variants of sectoral growth pattern of NMP, 1965-1930

(Annual average growth rates)

Country and sector	AA	BB	AB	BA
Bulgaria				
NMP total	6.6	7.0	6.4	7.3
Agriculture	2.4	2.4	2.4	2.4
NMP less agriculture	7.9	8.4	7.7	8.8
Industry	8.4	8.9	8.2	9.3
Construction	7.3	7.7	7.0	8.0
Others	6.6	7.0	6.4	7.3
Czechoslovakia				
NMP total	5.5	5.4	5.2	5.5
Agriculture	1.0	−1.0	−1.0	−1.0
NMP less agriculture	6.0	5.9	5.7	6.0
Industry	6.1	6.0	5.8	6.1
Construction	6.1	5.9	5.7	6.1
Others	5.5	5.4	5.2	5.5
Eastern Germany				
NMP total	5.4	5.5	5.3	5.5
Agriculture	0.4	0.4	0.4	0.4
NMP less agriculture	5.8	5.9	5.7	5.9
Industry	5.9	6.0	5.8	6.0
Construction	5.9	6.1	5.8	6.1
Others	5.4	5.5	5.3	5.5
Hungary				
NMP total	5.4	5.6	5.2	5.7
Agriculture	0.4	0.4	0.4	0.4
NMP less agriculture	6.1	6.3	5.9	6.4
Industry	6.3	6.4	6.0	6.6
Construction	5.9	6.2	5.7	6.3
Others	5.4	5.6	5.2	5.7
Poland				
NMP total	6.6	6.5	6.2	6.8
Agriculture	1.5	1.5	1.5	1.5
NMP less agriculture	7.5	7.4	7.1	7.8
Industry	7.8	7.1	7.4	8.1
Construction	7.3	7.1	6.8	7.5
Others	6.6	6.5	6.2	6.8

TABLE 2.28 *(continued)*

Country and sector	*AA*	*BB*	*AB*	*BA*
Romania				
NMP total	7.6	7.5	7.2	7.7
Agriculture	2.3	2.3	2.3	2.3
NMP less agriculture	8.8	8.7	8.4	9.0
Industry	9.2	9.1	8.8	9.4
Construction	8.4	8.2	7.9	8.5
Others	7.6	7.5	7.2	7.7
Soviet Union				
NMP total	6.5	6.6	6.2	6.9
Agriculture	2.6	2.6	2.6	2.6
NMP less agriculture	7.2	7.4	6.9	7.7
Industry	7.4	7.6	7.7	7.9
Construction	7.2	7.3	6.8	7.6
Others	6.5	6.6	6.2	6.9

AA = Derived on the assumptions of a smaller shift of labour from agriculture and smaller increase of employment in services.

BB = Derived on the assumptions of a larger shift of labour from agriculture and larger increase of employment in services.

AB = Derived on the assumptions of smaller shift of labour from agriculture and larger increase of employment in services.

BA = Output variant derived on the assumption of a larger shift of employment from agriculture and smaller increase of employment in services.

Depreciation is assumed to increase at the same rate as the NMP. Combining the values for services and depreciation with the appropriate values for NMP, the following variants of GDP growth are obtained:

GDP growth rates 1965-1980 obtained on various assumptions

	AA	*BB*	*AB*	*BA*
Bulgaria	6.3	6.8	6.2	7.0
Czechoslovakia	5.0	5.0	4.8	5.0
Eastern Germany	4.9	5.0	4.8	5.0
Hungary	4.9	5.2	4.8	5.2
Poland	6.2	6.3	6.0	6.5
Romania	7.2	7.2	7.0	7.4
Soviet Union	6.0	6.4	5.9	6.5

Derived on the following assumptions:

AA: a smaller shift of labour from agriculture and smaller increase of employment in services.

BB: a larger shift of labour out of agriculture and larger increase of employment in services.

AB: a smaller shift of labour from agriculture and smaller increase of employment in services.

BA: a larger shift of labour from agriculture and larger increase of employment in services.

(vii) Comparison with previous variants

It will be recalled that two alternatives were available as a starting point for the present exercise. One was to combine national historical averages with the results of cross-country analysis. The other was to extrapolate national trends using a " receding weight average " to give more weight to recent developments. Using the second alternative, the " first working variant " was derived which, as has been shown, yields figures which were either equal to or higher than those planned in a number of countries. It was concluded, however, that these figures—in most cases—are not consistent with expected output trends and expected productivity and employment changes, and hence new variants have been derived which are more consistent with these changes. One question which arises is how different are the present results from those which would obtain had the first alternative been used directly. Another is what changes are introduced with respect to figures serving as a starting point for the iterative process.

The table below reproduces the NMP projections from table 2.28, together with the " converging trends " and " the first working variants ". With respect to the " converging trend " figures, it can be noted that they do not differ very greatly from the revised variants. In three countries—Bulgaria, Hungary and the Soviet Union—they are well within the range of these variants. In Czechoslovakia, eastern Germany, Poland and Romania the " converging trend " figures are lower than the variants considered here.

Projected growth of NMP 1965-1980 various projection variants

	" Converging trends "	*" First working "*	*Revised variants*			
			AA	*BB*	*AB*	*BA*
Bulgaria	6.6	8.1	6.6	7.0	6.4	7.3
Czechoslovakia	4.8	5.9	5.5	5.4	5.2	5.5
Eastern Germany	5.1	5.2	5.4	5.5	5.3	5.5
Hungary	5.4	5.9	5.4	5.6	5.2	5.7
Poland	5.9	6.2	6.6	6.5	6.2	6.8
Romania	7.0	8.0	7.6	7.5	7.2	7.7
Soviet Union	6.4	6.9	6.5	6.6	6.2	6.9

On the other hand, differences between the " first working " and the revised variants are rather significant in most cases. The original figures for Bulgaria, Czechoslovakia and Romania—even in the highest of the revised variants considered—are considerably reduced, and only for eastern Germany and Poland does the lower figure reach the " first working " variant.

The sectoral growth proportions implied in the revised variants are almost identical to those in the " first projection ", as can be seen from the figures below.[42] The largest differences appear in the ratio of GDP to industrial growth in Czechoslovakia, eastern Germany and Hungary. This reflects the fact that in these countries—owing to a relatively slow expansion of the service sector—the difference between the NMP and GDP growth is projected to be larger than the three percentage points assumed in the " first projection ".

GDP and NMP growth rates as proportion of the industrial growth rate

	First projection variant		*Revised variants AB*	
	GDP	*NMP*	*GDP*	*NMP*
Bulgaria	.76	.79	.76	.78
Czechoslovakia	.85	.89	.83	.90
Eastern Germany	.86	.91	.83	.91
Hungary	.84	.88	.80	.87
Poland	.80	.84	.81	.84
Romania	.79	.82	.80	.82
Soviet Union	.84	.87	.83	.87

(viii) Comparison with " official " figures

Another question is how do the projected magnitudes and relationships compare with plans or similar official or semi-official figures.

(a) *The growth of NMP and of industry and growth ratios*

It can be seen from the figures below that for Bulgaria the newly-developed variants are lower than " planned ". For Czechoslovakia and Poland they are higher,[43] while for Romania the AB variant and for Hungary the AA variant are practically identical with the planned figures. The projected and planned relationships between NMP and industrial growth rates are, in Czechoslovakia, Poland and Romania, identical. The former are somewhat lower in Bulgaria and higher in Hungary.

1965-1980

	Bulgaria	*Czechoslovakia*	*Hungary*	*Poland*	*Romania*
Planned					
1. NMP	8.1	5.0[a]	5.4	6.0	7.2[a]
2. Industry	9.7	5.5[a]	6.5	7.1	8.7[a]
3. Ratio 1 : 2	.84	.90[a]	.83	.84	.83[a]
First Variant					
1. NMP	8.1	5.9	5.9	6.2	8.0
2. Industry	10.3	6.6	6.7	7.4	9.8
3. Ratio 1 : 2	.79	.89	.88	.84	.82
Variant AA					
1. NMP	6.6	5.5	5.4	6.6	7.6
2. Industry	8.4	6.1	6.3	7.8	9.2
3. Ratio 1 : 2	.79	.90	.86	.85	.83
Variant BB					
1. NMP	7.0	5.4	5.6	6.5	7.5
2. Industry	8.9	6.0	6.4	7.7	9.1
3. Ratio 1 : 2	.79	.90	.88	.84	.82
Variant AB					
1. NMP	6.4	5.2	5.2	6.2	7.2
2. Industry	8.2	5.8	6.0	7.4	8.8
3. Ratio 1 : 2	.78	.90	.87	.84	.82
Variant BA					
1. NMP	7.3	5.5	5.7	6.8	7.7
2. Industry	9.3	6.1	6.6	8.1	9.4
3. Ratio 1 : 2	.78	.90	.86	.84	.82

[a] 1970-1980.

(b) *Growth of employment and its distribution between the agricultural and the non-agricultural sectors*

Planned and projected figures, available for only four countries, are shown in table 2.29. The figures for the growth of the total labour force are identical for Bulgaria and the projected figures somewhat higher for Hungary and Poland and lower for Czechoslovakia. The latter country plans a smaller decline in the agricultural labour force than envisaged in both variants, whereas Poland plans a larger one. The Bulgarian and Hungarian plans fall between the two variants. The projected and planned figures for non-agricultural employment are rather similar for Czechoslovakia. Modest differences are to be seen in the other countries, notably in Poland, reflecting offsetting " errors " in the projection of the total and agricultural labour force.

The figures presented below show that Bulgaria and Poland provide for a shift from agricultural to non-agricultural employment which in terms of percentage points would be about equal to that which took place in the period 1950-1965. Czechoslovakia and Hungary foresee a much smaller shift.

---

[42] Only variant AB is compared. As can be seen from the text-table on the next page, growth proportions do not differ significantly as between the four variants.

[43] It should be noted that the comparisons for some countries are not quite valid since the estimates pertain to the period 1965-1980, whereas the " planned " figures pertain to different periods. Allowing for this, the " planned " figure for Czechoslovakia may be considered as being within the range of the estimates presented; see also page 29.

Table 2.29

Comparisons of planned and projected employment in agriculture and non-agriculture

	In thousands			Distribution per cent			1965 = 100		
		Projected			Projected			Projected	
	Planned	A	B	Planned	A	B	Planned	A	B
Bulgaria									
Total	4 807	4 802	4 802	100.0	100.0	100.0	112.6	112.5	112.5
Agriculture	1 050	1 303	908	21.8	27.1	18.9	53.3	60.2	46.1
Total less agriculture	3 757	3 499	3 894	78.2	72.9	81.1	163.4	152.2	169.4
Czechoslovakia									
Total	7 420	7 287	7 287	100.0	100.0	100.0	114.6	112.5	112.5
Agriculture	950	866	758	12.8	11.9	10.4	69.6	63.4	55.5
Total less agriculture	6 454	6 421	6 529	87.2	88.1	89.6	126.2	125.6	127.7
Hungary									
Total	5 339	5 377	5 377	100.0	100.0	100.0	108.6	109.3	109.3
Agriculture	900	1 088	806	16.9	20.2	15.0	59.2	71.6	53.0
Total less agriculture	4 439	4 289	4 571	83.1	79.8	85.0	130.8	126.3	134.6
Poland									
Total	18 938	20 343	20 343	100.0	100.0	100.0	123.4	130.5	130.5
Agriculture	5 738	6 935	6 326	30.3	34.1	31.1	84.1	101.6	92.7
Total less agriculture	13 200	13 408	14 017	69.7	65.9	68.9	161.4	153.0	160.0

Actual, planned and projected change in the share of agriculture in total employment

		1965-1980		
			Projected	
	1950-1965 Actual	Planned	A	B
Bulgaria	−27.2	−24.3	−19.0	−27.2
Czechoslovakia	−17.5	−8.3	−9.2	−10.7
Hungary	−19.2	−14.0	−10.7	−15.9
Poland	−12.7	−13.5	−9.7	−12.7

(c) *The growth of output per man*

Only two plan figures are available on the growth of output per man and these relate to industry. In Bulgaria, it is envisaged that industrial productivity will increase at an average rate of 7.6 per cent in the period 1965-1980. This is slightly higher than the increase of 7.2 per cent recorded in the period 1950-1965. In Czechoslovakia, a working hypothesis in long-term planning is that industrial productivity will rise at a rate of 4.7 per cent, which is almost identical with the average rate in the past (4.6 per cent). According to the method followed here, it was not necessary to derive any corresponding figures. However, using information on the past average relationship between the growth of productivity in industry and that in NMP excluding agriculture, and on the direction of movement of this ratio over time, it is possible to provide a rough estimate of productivity growth in industry consistent with the projected figures. The figure for Bulgaria (5.9 per cent) projected on this basis is significantly lower than the planned figure, whereas that for Czechoslovakia (4.8 per cent) is virtually identical with this figure.

(ix) A central variant for 1980

Thus far a number of growth variants for NMP and GDP have been derived based on different assumptions with respect to future patterns of labour supply. The problem now is to select a variant to serve as a central working hypothesis for further analysis. An average of variants BB and AB is selected in the light of the apparent under-development of the service sector in a number of countries. Combining these growth rates with estimates of GDP in 1965, expressed in 1963 " average " US dollars, and utilizing the population projections for 1980 already described, the data are obtained as shown in table 2.30.

Several features may be noted. First, the growth rate of the area as a whole in the period 1965-1980 is estimated to be one percentage point lower than in the period 1950-1965. This is mainly due to a projected deceleration of the GDP in the Soviet Union from a rate of 7.6 to 6.1 per cent. In eastern Europe, the growth rate is assumed to decrease slightly—the combined effect of a fairly significant deceleration in Bulgaria, eastern Germany and Romania, a stable growth in Czechoslovakia and Poland and a somewhat faster growth in Hungary. With a projected increase in the population at a rate of 0.9 per cent against the 1.4 per cent recorded in the period 1950-1965, the growth of per capita GDP is estimated to be only 0.5 per cent lower than in the previous fifteen-year period. As in the case of GDP, this is the result of a projected slower increase in the Soviet Union. In eastern Europe consi-

TABLE 2.30

Estimates of GDP, population and GDP per capita, 1965 and 1980

GDP

Country	*In billions of dollars 1963 " average prices "*		*Percentage distribution*		*Average annual growth rates (per cent)*	
	1965	*1980*	*1965*	*1980*	*1950-1965*	*1965-1980*
Bulgaria	6.36	16.35	2.0	2.2	7.1	6.5
Czechoslovakia	17.56	35.99	5.5	4.7	4.8	4.9
Eastern Germany	22.94	47.03	7.2	6.2	5.6	4.9
Hungary	8.83	18.36	2.8	2.4	4.7	5.0
Poland	27.40	66.59	8.6	8.8	6.2	6.1
Romania	11.93	33.37	3.7	4.4	7.7	7.1
Total eastern Europe	95.02	217.70	29.8	28.6	5.8	5.7
Soviet Union	223.41	542.88	70.2	71.4	7.6	6.1
Eastern Europe and Soviet Union	318.43	760.58	100.0	100.0	7.0	6.0

Population

	In millions		*Percentage distribution*		*Average annual growth rates (per cent)*	
	1965	*1980*	*1965*	*1980*	*1950-1965*	*1965-1980*
Bulgaria	8.20	9.10	2.5	2.4	0.8	0.7
Czechoslovakia	14.16	15.49	4.3	4.1	0.9	0.6
Eastern Germany	17.02	17.55	5.1	4.6	−0.5	0.2
Hungary	10.15	10.62	3.1	2.8	0.6	0.3
Poland	31.50	36.69	9.5	9.7	1.6	1.0
Romania	19.03	21.41	5.8	5.6	1.0	0.8
Total eastern Europe	100.05	110.85	30.3	29.2	0.9	0.7
Soviet Union	230.56	268.60	69.7	70.8	1.6	1.0
Eastern Europe and Soviet Union	330.61	379.45	100.0	100.0	1.4	0.9

GDP per capita

	In dollars 1963 average prices		*Average of region = 100*		*Average annual growth rates (per cent)*	
	1965	*1980*	*1965*	*1980*	*1950-1965*	*1965-1980*
Bulgaria	775	1 797	81	90	6.3	5.8
Czechoslovakia	1 240	2 324	129	116	3.9	4.3
Eastern Germany	1 348	2 680	140	134	6.1	4.7
Hungary	870	1 730	90	86	4.1	4.7
Poland	870	1 815	90	91	4.5	5.0
Romania	627	1 559	65	78	6.6	6.3
Total eastern Europe	950	1 964	99	98	5.0	4.9
Soviet Union	969	2 021	101	101	5.8	5.0
Eastern Europe and Soviet Union	963	2 004	100	100	5.5	5.0

TABLE 2.31

Growth of GDP and of NMP by sectors 1950-1965 [a] and "Central Projection" for 1980

Country and period	*GDP total*	*Depreciation*	*Non-material services*	*NMP total*	*Agriculture*	*NMP less agriculture*	*Industry*	*Construction*	*Material services*
Bulgaria									
1952-1965	7.1	11.6	4.2	7.6	3.3	10.7	13.4	8.9	6.1
1965-1980	6.5	6.7	5.2	6.7	2.4	8.1	8.5	7.4	6.7
Czechoslovakia									
1950-1965	4.8	5.5	4.9	4.8	−2.8	6.9	7.2	9.4	3.6
1965-1980	4.9	5.3	3.1	5.3	−1.0	5.8	5.9	5.8	5.3
Eastern Germany									
1952-1965	5.6	5.9	3.6	6.2	0.4	7.2	7.5	7.7	6.3
1965-1980	4.9	5.4	2.2	5.4	0.4	5.8	5.9	5.9	5.4
Hungary									
1950-1965	4.7	6.2	2.3	5.4	−0.1	7.5	8.1	6.8	5.2
1965-1980	5.0	5.4	3.4	5.4	0.4	6.1	6.2	6.0	5.4
Poland									
1950-1965	6.2	4.6	4.7	6.8	2.1	9.1	9.8	8.0	8.0
1965-1980	6.1	6.3	5.0	6.3	1.5	7.2	7.6	6.9	6.3
Romania									
1950-1965	7.7	7.2	4.8	8.3	3.6	11.3	14.0	12.4	5.7
1965-1980	7.1	7.3	5.2	7.3	2.3	8.6	8.9	8.1	7.3
Soviet Union									
1950-1965	7.6	10.1	5.2	8.2	3.5	10.2	10.6	8.8	9.8
1965-1980	6.4	6.4	4.9	6.4	2.6	7.2	7.4	7.0	6.4

[a] Geometric growth rate.

dered as a whole, the growth of per capita GDP, is estimated to continue at about the same rate. However, considerable differences between individual countries also appear here. A deceleration is projected for Bulgaria, eastern Germany and Romania and an acceleration for Czechoslovakia, Hungary and Poland. Second, the inter-country pattern of growth of GDP and of population would be such as to continue to narrow the spread in the per capita GDP within the area; moreover, the rank order of the various countries would undergo some change. Third, the GDP of the area would reach a figure of some 760 billion United States dollars, of which around 71 per cent would be accounted for by the Soviet Union. On a per capita basis, this would amount to some 2,000 dollars (slightly more in the Soviet Union), a level about equal to that presently enjoyed by the most developed west European countries.

A comparison of projected sectoral growth rates with those in the period 1950-1965 is provided in table 2.31. Within the material sector, the growth of industry and construction would decelerate everywhere, but the growth rate of material services is projected to increase in some countries and to decrease in others. Agricultural production would also grow at a lower rate than in the past, with the exception of Czechoslovakia [44] and Hungary. In most countries the growth of non-material services is projected to increase at a faster rate than in the past, apart from Czechoslovakia and eastern Germany owing to the slow growth of the non-agricultural labour force.

Growth rates of employment and output per man have been projected in a somewhat less detailed sectoral breakdown. These are reproduced in table 2.32 which also provides comparable figures for 1950-1965. In industry and related sectors the growth of employment would decelerate everywhere except in eastern Germany. Bulgaria stands out as the country where the slow-down would be sharpest and Poland as that where it would be least pronounced. The rate of decline in the agricultural labour force is generally projected to increase—very significantly so in the Soviet Union and Hungary. Changes in the growth rate of labour productivity would follow a more mixed pattern. In industry and related sectors a somewhat faster expansion is projected for Bulgaria and Hungary, and a slower one for the other countries—except for Czechoslovakia where the growth rate would be equal to the past average. In agriculture, labour productivity would

---

[44] In Czechoslovakia, net output would decrease at a lower rate in accordance with the assumption made.

TABLE 2.32

Growth of employment and output per man, by sectors 1950-1965 and " Central Projections " 1965-1980

Country and sector	Employment		Output per man [c]	
	1950-1965	1965-1980	1950-1965	1965-1980
Bulgaria	[a]			
NMP total	0.1	0.2	7.5	6.6
NMP less agriculture	5.7	2.9	4.8	5.0
Agriculture	−2.7	−3.8	6.2	6.4
Non-material services	3.2	4.2	..	..
GDP total	0.5	0.8	6.6	5.7
Czechoslovakia				
NMP total	0.5	0.5	4.2	4.8
NMP less agriculture	2.4	1.4	4.4	4.3
Agriculture	−3.0	−3.4	0.2	2.5
Non-material services	3.9	2.1	..	..
GDP total	1.0	0.8	3.8	4.1
Eastern Germany	[a]		[a]	
NMP total	−0.2	0.2	6.4	5.2
NMP less agriculture	0.4	0.9	6.8	4.9
Agriculture	−2.0	−3.6	2.4	4.2
Non-material services	2.6	1.2	..	..
GDP total	0.2	0.4	5.4	4.5
Hungary				
NMP total	0.9	0.2	4.5	5.2
NMP less agriculture	4.0	1.6	3.3	4.5
Agriculture	−2.2	−3.1	2.1	3.6
Non-material services	1.3	2.3	..	..
GDP total	1.0	0.6	3.7	4.4
Poland				
NMP total	1.6	1.4	5.1	4.9
NMP less agriculture	3.6	2.7	5.4	4.4
Agriculture	0.1	−0.2	1.9	1.7
Non-material services	3.7	4.0	..	..
GDP total	1.8	1.8	4.3	4.3
Romania	[b]		[b]	
NMP total	0.7	0.7	7.5	6.6
NMP less agriculture	4.6	2.9	6.4	5.5
Agriculture	−0.8	−0.9	4.4	3.3
Non-material services	3.8	4.1	..	..
GDP total	0.9	1.1	6.7	5.9
Soviet Union				
NMP total	1.5	1.2	6.6	5.2
NMP less agriculture	3.7	2.6	6.2	4.4
Agriculture	−1.0	−2.1	4.5	4.8
Non-material services	4.2	3.9	..	..
GDP total	1.9	1.7	5.6	4.4

---

[a] 1952-1965. [b] 1951-1965.

[c] GDP total per employed person estimated on the assumption of a one per cent per year increase in productivity in the non-material service sector, see p. 7.

TABLE 2.33

Distribution of net output and employment and relative output per man, in 1965, and " central projection " 1980 in terms of 1963 prices

	1965			1980		
Country and sector	*Net Output*	*Employment*	*Relative output per man*	*Net Output*	*Employment*	*Relative output per man*
Bulgaria						
Material sectors excluding agriculture	58.8	41.4	1.42	73.0	56.4	1.29
Agriculture	26.0	46.1	0.56	14.4	23.0	0.63
Non-material services	15.2	12.5	1.21	12.6	20.6	0.61
Czechoslovakia						
Material sectors excluding agriculture	70.4	61.5	1.14	80.2	67.8	1.18
Agriculture	8.8	21.1	0.42	3.7	11.1	0.33
Non-material sectors	20.8	17.3	1.20	16.1	21.1	0.76
Eastern Germany						
Material sectors excluding agriculture	72.4	66.1	1.10	82.4	71.1	1.16
Agriculture	7.7	16.1	0.48	4.0	18.7	0.46
Non-material services	19.9	17.8	1.12	13.6	20.2	0.67
Hungary						
Material sectors excluding agriculture	64.6	51.6	1.25	75.7	59.7	1.27
Agriculture	13.0	30.9	0.42	6.6	17.6	0.38
Non-material services	22.4	17.5	1.28	17.7	22.7	0.78
Poland						
Material sectors excluding agriculture	64.8	42.3	1.53	76.0	48.3	1.57
Agriculture	17.7	43.8	0.40	9.1	32.6	0.28
Non-material services	17.5	13.9	1.26	14.9	19.1	0.78
Romania						
Material sectors excluding agriculture	65.0	33.2	1.96	79.4	43.1	1.84
Agriculture	23.0	57.4	0.40	11.6	42.2	0.27
Non-material services	12.0	9.4	1.26	9.0	14.7	0.61
Soviet Union						
Material sectors excluding agriculture	63.8	51.2	1.25	73.6	58.7	1.25
Agriculture	16.3	31.8	0.51	9.8	18.0	0.54
Non-material services	19.9	17.0	1.17	16.6	23.3	0.71

expand at a faster rate in Bulgaria, Czechoslovakia, Hungary and the Soviet Union, and at a slower rate in eastern Germany, Poland and Romania.

The projected shifts in the distribution of output, employment and changes in relative output per man are shown in table 2.33. The figures focus attention on the fact that, since agricultural productivity is expected to rise at a slower rate than in other material sectors in a number of countries, a significant widening of the income gap may develop unless it is counteracted by a continued price shift in favour of agriculture. The same, of course, follows with respect to the " non-material " service sector from the assumption made here that the growth of labour productivity in this sector represents only a fraction of that in material sectors.

Appendix table 2.1

Net material product by sectors of origin 1950-1967

(Indices 1963 = 100)

	1950	*1951*	*1952*	*1953*	*1954*	*1955*	*1956*	*1957*	*1958*	*1959*	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*
Bulgaria																		
NMP total																		
Official			42.1	51.1	50.1	53.6	54.0	61.2	65.4	79.7	85.2	87.8	93.2	100.0	110.1	117.7	130.8	143.0
Reweighted			45.2	57.2	49.8	55.3	56.3	64.5	67.8	81.8	86.6	88.0	93.0	100.0	110.2	117.3	130.9	143.0
Industry			23.9	26.9	30.2	34.1	39.1	49.6	55.1	70.6	80.2	85.9	90.4	100.0	112.2	123.2	138.5	157.0
Construction			40.3	49.6	49.6	53.1	55.1	56.7	59.5	75.3	84.9	89.4	95.0	100.0	110.7	122.7	142.0	165.8
Agriculture and forestry			70.5	94.3	65.7	81.5	76.0	89.1	86.7	101.0	98.7	92.6	95.4	100.0	110.7	108.0	121.9	121.8
Transport and communications			23.0	33.1	37.1	40.1	40.9	44.2	52.5	67.1	75.0	81.8	90.4	100.0	120.5	135.0	151.5	171.5
Trade and other			66.0	81.6	86.1	68.8	72.7	63.0	73.0	79.1	81.1	84.2	96.3	100.0	96.3	111.9	112.9	125.5
NMP less agriculture			32.5	38.7	41.9	42.2	46.4	52.2	58.4	72.3	80.5	85.7	91.9	100.0	109.9	122.0	135.4	153.6
Czechoslovakia																		
NMP total																		
Official	45.6	50.0	55.2	58.8	60.9	67.1	70.7	75.9	82.2	87.3	94.4	100.8	102.3	100.0	100.6	104.0	114.6	122.5
Reweighted	51.8	54.7	59.3	63.4	64.7	71.4	73.8	78.6	84.6	88.0	94.5	100.8	101.9	100.0	100.6	104.0	114.7	122.2
Industry	37.6	43.8	48.2	50.4	52.4	57.7	62.8	68.1	74.5	80.8	88.3	97.0	102.8	100.0	101.5	107.2	116.7	123.2
Construction	33.3	37.9	54.1	61.5	63.4	72.3	81.7	86.0	92.6	109.2	119.5	124.8	118.5	100.0	112.3	128.0	149.0	167.6
Agriculture and forestry	126.4	115.1	111.4	121.8	106.9	119.3	114.5	114.0	117.3	103.1	107.2	104.6	87.4	100.0	95.2	82.2	95.5	96.4
Transport and communications	26.3	36.4	44.0	44.7	54.8	54.2	60.2	65.2	72.5	80.0	91.8	100.3	103.3	100.0	105.7	108.9	106.7	114.4
Trade and other	71.8	66.3	74.5	81.6	102.5	112.4	95.0	105.1	111.5	104.9	99.9	101.6	102.7	100.0	87.0	87.8	99.1	115.7
NMP less agriculture	39.6	44.8	50.8	53.8	57.8	63.5	67.2	72.8	79.2	85.5	92.4	100.2	104.3	100.0	101.5	107.6	117.8	126.4
Eastern Germany																		
NMP total																		
Official			53.0	56.2	60.9	65.7	68.8	72.8	79.5	86.9	92.6	94.6	96.9	100.0	105.0	109.8	115.1	121.3
Reweighted			50.1	53.3	58.5	63.9	67.0	70.7	78.1	85.9	91.6	94.4	96.8	100.0	105.0	109.7	115.0	121.3
Industry			40.7	42.2	50.6	57.2	59.7	62.7	72.8	82.2	87.4	93.0	95.7	100.0	104.5	108.7	114.0	120.1
Construction			46.8	47.0	50.5	56.8	64.4	71.5	75.0	91.7	97.3	100.0	103.3	100.0	112.2	120.4	128.1	137.3
Agriculture and forestry			103.3	103.9	103.5	94.6	98.8	103.6	104.1	102.0	108.2	96.2	96.9	100.0	102.1	108.2	113.3	120.2
Transport and communications			61.4	73.6	76.2	79.0	82.0	86.5	89.3	90.5	93.0	94.4	90.1	100.0	108.0	108.5	112.3	114.7
Trade and other			54.7	66.1	61.3	71.5	74.8	80.0	82.1	88.2	96.9	97.5	101.4	100.0	105.3	111.4	116.8	122.6
NMP less agriculture			44.3	47.9	53.6	60.6	63.5	67.2	75.3	84.1	89.8	94.2	96.8	100.0	105.3	109.8	115.2	121.2

Hungary																		
NMP total																		
Official	48.1	56.0	54.6	61.4	58.6	63.6	56.3	69.2	72.9	77.6	85.1	90.3	94.6	100.0	104.7	105.9	114.8	124.8
Reweighted	48.6	57.3	53.2	62.3	59.3	65.5	57.5	68.2	73.8	78.1	84.8	89.0	94.4	100.0	106.8	107.4	115.8	126.0
Industry	34.5	40.3	47.3	52.3	50.4	55.9	47.2	56.7	63.4	68.1	78.5	86.7	93.5	100.0	108.2	113.3	123.5	135.0
Construction	41.0	55.8	59.8	63.8	49.5	55.8	57.0	63.8	70.6	78.9	91.7	91.7	96.5	100.0	105.2	105.8	113.8	129.2
Agriculture and forestry	92.5	109.7	68.4	95.0	90.5	104.3	87.4	102.6	105.2	109.4	98.0	93.4	95.5	100.0	103.3	90.9	96.8	99.2
Transport and communications	26.0	33.6	43.1	52.9	51.4	50.6	45.6	53.5	58.2	65.6	80.5	87.5	92.6	100.0	107.6	108.5	113.8	124.6
Trade and other	67.9	68.7	57.2	58.5	64.3	59.4	67.1	82.5	85.9	81.0	93.3	93.1	97.4	100.0	106.9	106.3	109.3	122.8
NMP less agriculture	37.9	44.4	49.5	54.3	51.6	55.9	50.1	59.7	66.0	70.4	81.5	87.9	94.2	100.0	107.7	111.5	120.5	132.6
Poland																		
NMP total																		
Official	40.8	43.9	46.6	51.4	56.9	61.7	66.0	73.1	77.1	81.2	84.7	91.6	93.5	100.0	106.8	114.2	121.8	128.6
Reweighted	43.2	46.2	49.4	54.5	57.8	61.5	65.6	70.9	75.4	79.3	84.5	92.8	94.6	100.0	106.8	115.0	122.7	129.1
Industry	30.0	34.6	39.4	44.6	48.8	53.4	56.6	62.4	67.5	72.8	79.0	87.4	94.9	100.0	110.1	121.0	129.3	138.7
Construction	35.8	44.5	52.2	59.9	59.9	60.8	66.3	68.8	76.9	88.1	87.3	90.8	96.0	100.0	108.6	114.1	123.8	141.1
Agriculture and forestry	79.7	78.6	78.2	80.6	81.9	85.4	90.2	93.3	96.2	91.3	95.6	107.0	91.1	100.0	100.7	105.3	109.9	108.0
Transport and communications	30.5	34.9	40.0	51.2	56.0	52.0	54.5	62.5	63.2	74.5	80.7	86.5	96.3	100.0	105.0	116.0	127.2	130.9
Trade and other	38.1	37.9	37.0	42.0	47.2	53.9	59.5	68.5	72.5	79.1	85.2	91.8	98.5	100.0	104.7	109.1	116.6	120.8
NMP less agriculture	32.0	36.3	40.6	46.5	50.4	54.2	58.0	64.1	69.0	75.7	81.0	88.4	95.7	100.0	108.7	118.0	126.6	135.6
Romania																		
NMP total																		
Official	29.6	38.8	40.5	46.7	46.4	56.8	52.7	61.2	63.3	71.6	79.3	87.3	91.1	100.0	111.5	122.2	134.4	143.8
Reweighted	36.4	48.1	46.7	54.6	52.5	65.9	54.4	66.9	64.1	74.9	82.0	89.4	91.6	100.0	110.6	120.2	131.2	141.0
Industry	18.5	23.9	28.0	31.9	33.9	40.4	41.5	46.9	53.1	58.9	68.9	78.5	89.6	100.0	114.8	131.5	144.6	164.4
Construction	19.8	26.9	33.6	41.9	31.2	43.1	51.6	54.7	59.5	69.6	83.8	91.7	96.8	100.0	108.7	114.4	123.6	141.8
Agriculture and forestry	62.1	83.9	72.7	87.6	78.3	105.6	65.8	97.5	78.3	103.7	104.3	108.1	95.7	100.0	103.7	105.6	122.5	121.4
Transport and communications	20.2	24.9	32.4	38.5	41.1	47.4	51.8	55.5	54.7	55.9	66.4	77.7	84.4	100.0	109.7	119.4	131.3	145.6
Trade and other	62.6	80.2	71.4	78.3	82.8	91.4	82.2	83.3	80.0	76.4	81.6	88.3	87.9	100.0	113.4	116.3	102.3	90.7
NMP less agriculture	25.5	33.0	35.6	40.6	41.5	49.0	49.6	53.9	58.1	62.7	72.5	81.5	89.9	100.0	113.6	126.4	134.9	149.3
Soviet Union																		
NMP total																		
Official	32.1	35.9	39.9	43.8	49.1	54.9	61.1	65.3	73.5	79.4	85.3	91.2	96.3	100.0	109.6	116.9	126.5	137.5
Reweighted	36.0	38.7	42.5	46.3	51.5	56.5	62.9	68.7	75.2	80.4	86.4	92.0	97.2	100.0	109.8	116.9	126.4	137.5
Industry	26.1	30.4	33.8	37.8	42.8	48.0	53.0	58.4	64.0	70.5	76.3	83.9	91.7	100.0	107.0	117.9	128.9	142.3
Construction	32.2	37.5	42.8	44.1	50.0	52.6	59.2	67.1	77.0	84.2	93.4	95.4	96.7	100.0	105.9	113.8	120.4	133.6
Agriculture and forestry	69.7	66.2	70.8	72.8	76.6	83.8	94.5	97.7	106.4	104.3	108.4	110.7	111.6	100.0	120.2	115.9	125.4	126.6
Transport and communications	22.6	24.7	26.9	29.0	32.3	37.6	44.1	52.7	59.1	72.0	82.8	87.1	92.5	100.0	109.7	117.2	129.0	141.9
Trade and other	31.9	36.8	40.1	49.5	58.2	60.4	65.4	74.7	78.6	85.7	91.2	96.7	100.0	100.0	107.7	116.5	119.8	135.2
NMP less agriculture	27.3	31.7	35.2	39.5	45.0	49.5	54.8	61.2	67.1	74.2	80.7	87.2	93.4	100.0	107.2	117.2	126.7	140.3

APPENDIX TABLE 2.II

Employed persons by main sectors of the economy 1950-1967

(Indices 1963 = 100)

	1950	*1951*	*1952*	*1953*	*1954*	*1955*	*1956*	*1957*	*1958*	*1959*	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*
Bulgaria																		
Total			94.7	95.2	95.8	96.3	96.9	97.4	97.9	98.4	98.8	99.3	99.7	100.0	100.4	100.6	101.0	101.7
Material sectors			98.4	98.8	98.8	98.9	99.6	100.0	100.3	100.6	100.2	100.2	100.2	100.0	100.3	100.3	100.4	100.8
Industry			51.4	53.6	56.7	58.0	60.5	69.1	72.4	83.8	92.1	93.3	95.3	100.0	102.7	109.4	118.7	124.0
Construction			52.1	52.1	55.6	56.5	52.9	47.4	52.0	60.7	78.6	83.7	92.4	100.0	102.4	109.9	122.9	134.8
Agriculture and forestry			133.2	131.0	128.3	127.5	127.8	124.9	122.1	115.4	107.6	105.7	104.0	100.0	98.2	93.6	88.1	84.0
Transport and communications			51.9	69.2	76.4	79.8	80.1	83.4	83.9	89.4	100.4	104.4	98.3	100.0	104.9	106.8	112.2	117.2
Trade and other			64.6	68.1	70.9	71.6	72.9	70.8	82.1	86.4	89.0	92.7	95.2	100.0	104.1	108.2	102.2	106.7
Non-material sectors			68.3	69.8	74.5	77.7	77.1	78.6	80.9	82.1	88.5	92.5	96.0	100.0	100.6	102.3	105.3	107.9
Material sectors less agriculture			53.2	56.9	60.4	61.8	63.0	67.7	71.9	81.4	90.6	93.0	95.2	100.0	103.1	109.0	116.5	122.6
Czechoslovakia																		
Total	88.4	88.6	88.7	90.0	92.7	94.4	95.8	96.7	96.7	96.0	96.1	97.6	99.2	100.0	101.0	102.6	104.7	105.9
Material sectors	93.4	93.3	93.2	94.3	96.8	98.4	99.7	100.2	100.2	98.7	98.3	98.9	99.9	100.0	100.4	101.1	102.9	103.4
Industry	69.4	73.7	75.3	76.6	79.3	80.5	83.2	86.6	87.7	89.2	93.9	96.8	99.9	100.0	101.1	102.9	105.7	106.6
Construction	69.6	74.5	78.1	79.6	80.2	79.8	83.4	85.8	90.5	98.0	99.0	103.0	102.8	100.0	100.6	103.0	106.9	110.1
Agriculture and forestry	151.5	141.8	137.1	137.7	140.1	142.5	140.4	135.1	131.2	121.3	110.4	104.1	101.2	100.0	97.9	96.1	95.6	93.7
Transport and communications	71.7	73.7	77.0	79.7	82.7	84.7	88.0	89.2	92.0	90.2	91.7	94.7	97.2	100.0	102.2	104.5	106.7	109.0
Trade and other	86.3	85.2	84.1	83.9	87.0	89.2	90.3	90.4	89.5	89.2	90.3	94.2	96.2	100.0	102.0	102.5	103.1	104.0
Non-material sectors	62.0	64.1	65.4	68.0	71.5	73.7	75.6	78.4	78.8	81.7	84.7	90.6	95.3	100.0	104.3	110.4	113.9	119.3
Material sectors less agriculture	72.1	75.5	77.1	78.4	80.9	82.1	84.8	87.3	88.8	90.4	93.8	97.1	99.5	100.0	101.3	103.0	105.6	106.9
Eastern Germany																		
Total			98.4	99.8	103.3	103.1	102.4	103.0	102.3	101.7	101.3	101.1	101.3	100.0	100.8	101.6	102.0	102.7
Material sectors			103.6	104.9	107.7	107.9	106.5	107.2	106.7	104.8	102.7	102.1	101.8	100.0	100.7	101.3	101.2	101.7
Industry			96.8	98.8	102.6	100.4	98.9	103.5	104.1	103.2	101.3	100.1	99.5	100.0	99.5	100.4	101.1	102.0
Construction			97.8	102.4	96.2	98.2	97.8	99.6	100.4	100.0	99.4	95.4	98.4	100.0	96.8	98.6	98.4	101.2
Agriculture and forestry			130.8	128.7	130.5	136.5	129.5	124.8	120.2	114.0	107.8	108.5	109.7	100.0	101.1	100.1	97.7	96.3
Transport and communications			101.7	100.9	107.5	105.1	108.6	98.3	100.2	99.6	100.2	101.7	100.4	100.0	109.0	107.9	108.4	108.4
Trade and other			93.8	97.1	99.9	101.5	104.4	104.6	103.9	103.4	104.0	104.3	101.5	100.0	102.0	104.0	104.2	104.6
Non-material sectors			73.7	75.7	82.7	80.3	83.1	83.4	82.0	87.1	94.4	96.3	98.9	100.0	101.1	102.9	105.5	107.7
Material sectors less agriculture			96.9	99.0	102.0	100.8	100.7	102.8	103.3	102.5	101.5	100.5	99.8	100.0	100.7	101.6	102.1	103.0

Hungary																		
Total	87.7	89.8	90.8	91.6	92.8	94.7	95.4	95.9	97.5	99.1	99.4	98.7	99.0	100.0	100.9	101.7	102.7	103.8
Material sectors	88.1	90.4	91.3	92.0	93.9	95.8	97.0	98.5	100.5	101.8	101.5	99.8	99.5	100.0	100.5	101.1	102.0	103.2
Industry	56.7	60.0	64.1	69.6	75.3	77.2	76.8	79.6	84.5	87.8	91.1	93.5	96.3	100.0	104.3	106.9	108.0	110.4
Construction	59.7	82.8	99.7	99.6	85.3	77.2	78.1	80.6	85.2	91.7	94.3	93.8	96.7	100.0	100.2	106.5	114.8	118.1
Agriculture and forestry	132.9	130.4	124.8	120.4	120.9	123.4	125.9	126.5	124.8	122.4	116.2	109.1	104.4	100.0	96.6	95.2	94.6	94.3
Transport and communications	58.0	63.8	69.2	74.3	76.4	79.8	82.3	81.3	84.3	90.2	94.2	96.0	97.8	100.0	102.0	102.2	102.7	103.5
Trade and other	64.5	65.9	65.7	66.9	71.6	77.5	78.6	80.4	82.8	85.7	90.8	92.9	94.7	100.0	100.6	98.1	98.9	101.0
Non-material sectors	86.1	86.7	88.3	89.5	87.3	89.0	87.6	83.0	83.2	85.9	88.9	93.3	96.7	100.0	103.2	104.9	106.5	106.6
Material sectors less agriculture	58.4	64.0	69.1	73.3	76.1	77.6	77.9	80.0	84.3	88.3	91.8	93.7	96.3	100.0	103.0	105.0	106.8	109.1
Poland																		
Total	79.2	81.7	82.9	84.9	86.4	88.6	90.2	91.6	91.7	92.8	93.4	95.5	97.7	100.0	101.3	103.9	105.8	107.7
Material sectors	81.9	84.1	85.4	87.3	88.3	90.2	91.6	92.9	93.3	94.3	94.2	96.1	97.8	100.0	101.0	103.5	105.2	106.6
Industry	61.2	65.4	68.3	72.3	74.9	78.6	82.1	86.7	88.2	89.3	89.4	92.2	96.5	100.0	102.9	108.1	112.0	116.6
Construction	57.4	73.3	80.1	86.5	82.4	83.1	85.2	84.9	84.0	91.6	89.8	92.7	93.8	100.0	97.2	101.4	104.1	110.0
Agriculture and forestry	99.7	99.2	99.5	99.2	99.6	100.2	100.2	99.8	99.5	99.1	98.7	99.6	99.6	100.0	101.0	101.3	101.2	100.1
Transport and communications	56.6	58.5	54.8	64.5	70.8	74.6	78.3	82.9	88.3	90.4	91.5	92.9	95.8	100.0	100.8	105.0	111.3	113.8
Trade and other	77.3	77.9	78.3	77.5	78.5	82.4	83.5	83.6	81.9	85.5	87.7	92.3	96.4	100.0	98.6	103.0	104.5	106.8
Non-material sectors	61.9	66.3	67.4	70.1	73.9	78.0	81.6	83.2	81.6	83.3	87.7	92.0	96.4	100.0	103.2	106.3	109.8	114.5
Material sectors less agriculture	62.6	67.8	70.1	74.4	76.2	79.4	82.3	85.4	86.6	89.2	89.4	92.4	96.0	100.0	101.1	105.9	109.5	113.6
Romania																		
Total		88.5	90.0	91.9	94.5	96.7	98.5	98.6	98.5	99.0	99.2	99.5	99.7	100.0	100.4	100.8	101.7	102.5
Material sectors		90.9	92.6	94.4	96.8	99.1	100.8	100.7	100.6	100.9	100.6	100.3	100.0	100.0	100.2	100.1	100.6	101.0
Industry		62.1	64.0	66.1	70.0	73.0	75.2	76.7	78.2	80.7	84.6	90.3	95.8	100.0	104.3	109.7	114.9	118.2
Construction		38.7	53.2	62.9	64.1	62.8	63.7	57.6	52.5	56.1	67.4	79.3	92.0	100.0	99.9	99.0	101.0	108.3
Agriculture and forestry		108.1	108.1	108.6	110.2	112.4	114.0	114.0	114.0	113.4	110.2	106.4	102.7	100.0	98.4	96.3	94.7	93.1
Transport and communications		64.5	67.9	70.6	76.1	81.1	82.2	82.0	81.3	82.3	87.0	90.8	94.4	100.0	106.2	111.7	116.6	121.1
Trade and other		62.4	67.0	72.4	81.2	85.8	87.9	89.7	89.5	88.1	89.4	93.1	96.2	100.0	105.0	109.8	114.5	118.6
Non-material sectors		63.6	63.4	66.5	70.6	72.3	74.8	77.0	77.4	80.0	85.2	90.7	96.2	100.0	103.2	107.8	112.8	118.1
Material sectors less agriculture		57.4	62.5	66.7	70.8	73.3	75.1	74.9	74.6	76.6	81.8	88.4	94.9	100.0	103.6	107.7	112.1	116.5
Soviet Union																		
Total	79.9	81.1	81.9	82.9	85.0	87.0	89.5	91.1	92.9	94.0	95.7	98.0	98.9	100.0	100.6	105.7	108.6	111.6
Material sectors	83.7	84.8	85.6	86.4	88.6	90.8	93.3	94.6	96.2	96.8	97.8	99.2	99.5	100.0	99.7	104.7	107.3	109.8
Industry	66.5	70.0	71.9	74.6	78.6	79.0	83.6	84.3	85.3	86.5	88.9	93.7	97.0	100.0	103.5	108.0	112.2	115.7
Construction	53.7	55.3	56.8	58.4	61.5	64.5	70.7	78.3	85.6	92.2	98.4	100.9	98.8	100.0	72.8	107.5	110.2	114.4
Agriculture and forestry	115.4	113.9	112.7	111.5	112.1	115.4	115.7	116.0	115.7	112.7	110.0	106.6	103.3	100.0	99.1	99.4	100.0	100.6
Transport and communications	60.4	63.6	66.8	69.3	71.2	73.2	75.6	77.7	82.3	86.3	90.9	94.7	97.3	100.0	103.4	107.0	109.3	111.3
Trade and other	56.1	57.4	58.7	59.9	62.3	64.9	66.4	69.5	73.4	79.6	84.5	90.8	95.3	100.0	105.6	111.6	116.7	122.6
Non-material sectors	60.0	61.6	63.1	64.7	66.1	67.7	70.2	72.9	75.9	79.5	84.5	91.8	95.8	100.0	105.0	110.9	115.6	120.8
Material sectors less agriculture	62.4	65.2	67.2	69.5	72.8	74.1	78.1	80.2	82.9	86.1	89.7	94.2	97.0	100.0	100.2	108.3	112.2	116.0

Appendix table 2.III

Output per man of net material product by sectors 1950-1967

(Indices 1963 = 100)

	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967
Bulgaria																		
NMP total [a]			45.9	57.9	50.4	55.9	56.5	64.5	67.6	81.3	86.4	87.8	92.9	100.0	109.8	116.9	130.3	141.9
Industry			46.5	50.2	53.3	58.8	64.6	71.8	76.1	84.2	87.1	92.1	94.9	100.0	109.2	112.6	116.7	126.6
Construction			77.4	95.2	89.3	94.1	104.1	119.6	114.5	124.0	108.0	106.8	102.9	100.0	108.1	111.7	115.6	123.0
Agriculture and forestry			53.0	72.0	51.3	63.9	59.5	71.3	71.0	87.5	91.8	87.6	91.7	100.0	112.7	115.3	138.4	145.0
Transport and communications			44.4	47.8	48.6	50.3	51.0	53.0	62.6	75.0	74.7	78.3	91.9	100.0	114.9	126.4	134.9	146.3
Trade and other			102.3	119.8	121.3	96.1	99.6	88.9	89.0	91.6	91.2	90.8	101.2	100.0	92.5	103.5	110.4	117.6
NMP less agriculture			61.1	68.0	69.3	68.2	73.6	77.1	81.1	88.8	88.9	92.2	96.5	100.0	106.6	111.9	116.2	125.2
Czechoslovakia																		
NMP total [a]	55.4	58.6	63.6	67.2	66.8	72.5	74.0	78.4	84.4	89.1	96.1	101.9	102.0	100.0	100.2	102.9	111.4	118.2
Industry	54.2	59.4	64.0	65.8	66.1	71.6	75.4	78.6	84.9	90.6	94.1	100.2	102.9	100.0	100.4	104.2	110.3	115.6
Construction	47.9	50.9	69.3	77.2	79.0	90.6	98.0	100.3	102.3	111.4	120.7	121.2	115.3	100.0	111.6	124.3	139.4	152.2
Agriculture and forestry	83.4	81.2	81.2	88.5	76.3	83.7	81.6	84.4	89.4	85.0	97.1	100.5	86.4	100.0	97.3	85.6	99.9	102.8
Transport and communications	36.7	49.4	57.1	56.0	66.2	63.9	68.4	73.0	78.8	88.6	100.0	105.9	106.2	100.0	103.4	104.2	100.0	105.0
Trade and other	83.2	77.8	88.6	97.2	117.8	126.1	105.3	116.2	124.5	117.6	110.7	107.8	106.7	100.0	85.3	85.6	96.2	111.3
NMP less agriculture	54.9	59.3	65.9	68.7	71.4	77.3	79.3	83.3	89.2	94.5	98.5	103.2	104.8	100.0	100.2	104.5	111.6	118.2
Eastern Germany																		
NMP total [a]			48.3	50.8	54.3	59.2	62.9	66.0	73.2	81.9	89.1	92.4	95.1	100.0	104.2	108.3	113.6	119.2
Industry			42.0	42.7	49.3	57.0	60.3	60.6	69.9	79.7	86.3	92.9	96.2	100.0	105.0	108.3	112.8	117.8
Construction			47.9	45.9	52.5	57.8	65.9	71.8	74.7	91.7	97.9	104.9	105.0	100.0	115.9	122.1	130.2	135.6
Agriculture and forestry			79.0	80.7	79.3	69.3	76.3	83.0	86.6	89.5	100.3	88.6	88.3	100.0	101.0	108.1	116.0	124.8
Transport and communications			60.4	72.9	70.9	75.2	75.5	88.0	89.1	90.8	92.8	92.8	89.8	100.0	99.1	100.6	103.6	105.8
Trade and other			58.3	68.1	61.4	70.5	71.7	76.5	79.0	85.3	93.1	93.5	99.9	100.0	103.2	107.1	112.1	117.2
NMP less agriculture			45.8	48.3	52.5	60.1	63.0	65.3	72.8	82.1	88.5	93.7	96.9	100.0	104.6	108.1	112.9	117.7

Hungary																		
NMP total [a]	55.2	63.3	58.3	67.7	63.1	68.3	59.2	69.2	73.4	76.7	83.5	89.1	94.9	100.0	106.3	106.3	113.6	122.2
Industry	60.8	67.1	73.8	75.2	66.9	72.4	61.5	71.3	75.0	77.5	86.2	92.8	97.1	100.0	103.8	106.0	114.3	122.3
Construction	68.7	67.4	60.0	64.0	58.1	72.3	73.0	79.1	82.8	86.0	97.2	97.7	99.7	100.0	104.9	99.3	99.1	109.4
Agriculture and forestry	69.6	84.1	54.8	78.9	74.8	84.5	69.4	81.1	84.3	89.4	84.3	85.6	91.4	100.0	106.9	95.5	102.3	105.2
Transport and communications	44.8	52.7	62.2	71.2	67.3	63.4	55.4	65.8	69.0	72.7	85.5	91.1	94.7	100.0	105.4	106.1	110.8	120.4
Trade and other	105.2	104.3	87.0	87.5	89.9	76.7	85.4	102.5	103.7	94.5	102.7	100.2	102.8	100.0	106.3	108.4	110.5	121.5
NMP less agriculture	64.8	69.3	71.6	74.0	67.9	72.1	64.3	74.6	78.3	79.8	88.8	93.8	97.8	100.0	104.6	106.2	112.8	121.6
Poland																		
NMP total [a]	52.7	54.9	57.9	62.5	65.4	68.2	71.6	76.4	80.8	84.1	89.6	96.5	96.7	100.0	105.7	111.1	116.7	121.1
Industry	49.0	52.9	57.7	61.7	65.1	67.9	69.0	72.0	76.5	81.5	88.4	94.8	98.3	100.0	107.0	111.9	115.5	118.9
Construction	62.4	60.8	65.1	69.2	72.7	73.1	77.8	81.1	91.6	96.2	97.2	98.0	102.3	100.0	111.7	112.5	118.9	128.3
Agriculture and forestry	79.9	79.3	78.6	81.3	82.3	85.2	90.1	93.5	96.7	92.1	96.9	107.5	91.5	100.0	99.7	103.9	108.7	107.8
Transport and communications	53.9	59.7	73.0	79.4	79.1	69.7	69.6	75.4	71.6	82.4	88.2	93.1	100.5	100.0	104.2	110.5	114.3	115.0
Trade and other	49.3	48.7	47.3	54.2	60.1	65.4	71.2	81.9	88.5	92.5	97.2	99.5	102.1	100.0	106.2	106.0	111.6	113.1
NMP less agriculture	51.0	53.5	57.9	62.5	66.2	68.3	70.5	75.0	79.7	84.8	90.6	95.7	99.7	100.0	107.6	111.4	115.7	119.3
Romania																		
NMP total [a]		53.0	50.4	57.9	54.2	66.5	54.0	66.5	63.7	74.2	81.5	89.2	91.6	100.0	110.4	120.0	130.4	139.5
Industry		38.5	43.8	48.3	48.4	55.3	55.2	61.2	67.9	73.0	81.5	86.9	93.5	100.0	110.1	119.8	125.9	139.0
Construction		69.5	63.1	66.6	48.7	68.6	81.0	95.0	113.3	124.1	124.3	115.6	105.3	100.0	108.9	115.6	122.3	130.9
Agriculture and forestry		77.6	67.2	80.6	71.0	94.0	57.7	85.5	68.7	91.4	94.6	101.6	93.2	100.0	105.4	109.7	129.4	130.5
Transport and communications		38.6	47.7	54.5	54.0	58.5	63.0	67.6	67.3	67.9	76.3	85.5	89.4	100.0	103.3	106.9	112.6	120.2
Trade and other		128.5	106.4	108.0	102.0	106.5	93.5	92.8	89.3	86.7	91.2	94.8	91.3	100.0	108.0	106.0	89.3	76.5
NMP less agriculture		57.4	57.0	60.9	58.6	66.8	66.0	72.0	77.9	81.8	88.6	92.2	94.7	100.0	109.6	117.4	120.3	128.1
Soviet Union																		
NMP total [a]	43.0	45.7	49.6	53.6	58.1	62.3	67.5	72.6	78.2	83.1	88.3	92.7	96.7	100.0	110.1	111.7	117.8	125.3
Industry	39.3	43.4	47.0	50.7	54.5	60.7	63.4	69.2	75.1	81.5	85.8	89.6	94.6	100.0	103.4	109.2	114.9	123.0
Construction	60.0	67.8	75.2	75.5	81.3	81.6	83.7	85.7	89.9	91.3	94.9	94.6	97.9	100.0	145.5	105.9	109.2	116.8
Agriculture and forestry	60.4	58.1	62.8	65.3	68.3	72.6	81.7	84.2	91.9	92.6	98.6	103.8	108.0	100.0	121.3	116.6	125.4	125.8
Transport and communications	37.4	38.9	40.2	41.9	45.3	51.4	58.3	67.8	71.9	83.5	91.1	92.0	95.1	100.0	106.1	109.5	118.0	127.6
Trade and other	56.8	64.2	68.4	82.5	93.4	93.1	98.5	107.6	107.0	107.6	108.0	106.5	104.9	100.0	102.0	104.4	102.7	110.2
NMP less agriculture	43.9	48.6	52.3	56.8	61.8	66.8	70.1	76.3	81.0	86.2	90.0	92.5	96.4	100.0	107.0	108.2	112.9	121.0

---

[a] Reweighted.

APPENDIX

Price indices by

(Indices

	1950	1951	1952	1953	1954	1955	1956
Bulgaria							
NMP total			96.0	87.5	92.4	91.1	85.9
Industry			151.1	143.3	122.2	110.9	103.0
Construction			99.2	92.9	102.0	92.3	86.6
Agriculture and forestry			52.4	47.5	52.7	59.2	63.0
Transport and communications			144.6	152.6	156.0	152.3	124.9
Trade and other			148.3	141.0	128.5	152.3	113.0
NMP less agriculture			143.1	136.2	123.6	121.9	104.7
Czechoslovakia							
NMP total	95.5	108.6	113.1	117.6	110.0	108.4	104.3
Industry	120.9	134.1	142.8	147.8	129.5	124.8	114.5
Construction	158.5	179.5	147.0	143.0	149.0	136.1	133.4
Agriculture and forestry	48.5	52.5	49.0	58.9	63.1	71.6	76.8
Transport and communications	161.5	137.0	130.8	134.5	105.5	114.1	107.1
Trade and other	87.5	87.9	88.0	88.8	86.5	84.5	77.5
NMP less agriculture	120.0	132.1	136.0	139.3	124.1	119.6	112.0
Eastern Germany							
NMP total			104.4	103.7	102.6	102.1	101.8
Industry			109.7	110.3	109.3	105.4	107.0
Construction			113.8	123.4	118.6	122.3	119.5
Agriculture and forestry			52.8	49.4	56.7	67.8	62.4
Transport and communications			104.0	102.2	100.1	88.0	98.8
Trade and other			150.1	137.7	126.3	116.2	113.3
NMP less agriculture			117.4	116.4	112.2	107.8	108.4
Hungary							
NMP total	58.7	71.1	86.6	83.2	90.2	89.8	89.6
Industry	66.6	65.0	90.7	85.8	88.7	86.0	82.5
Construction	48.0	48.8	55.0	55.3	55.9	58.0	57.8
Agriculture and forestry	38.8	62.9	60.5	61.9	75.9	86.2	92.9
Transport and communications	153.6	152.7	127.9	125.5	127.3	128.5	127.2
Trade and other	97.0	136.0	169.4	176.5	171.3	156.3	138.9
NMP less agriculture	72.3	76.1	95.5	92.4	96.3	91.5	88.2
Poland							
NMP							88.3
Industry							98.8
Construction							90.3
Agriculture and forestry							74.4
Transport and communications							102.2
Trade and other							79.4
NMP less agriculture							94.9
Soviet Union							
NMP total							
Industry							
Construction							
Agriculture and forestry							
Transport and communications							
Trade and other							
NMP less agriculture							

TABLE 2.IV

sector, 1950-1967

1964 = 100)

1957	*1958*	*1959*	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*
87.7	88.1	90.9	91.4	94.4	97.7	100.0	99.2	99.7	97.8	96.1
104.3	99.8	101.1	101.3	99.3	99.7	100.0	97.5	95.3	92.5	90.3
99.7	83.0	98.9	93.2	83.0	88.7	100.0	100.0	100.0	100.0	100.0
64.9	73.6	73.1	77.1	86.3	95.6	100.0	100.8	108.8	109.2	106.6
113.9	97.6	112.8	107.2	103.5	98.1	100.0	96.5	97.9	98.0	84.9
118.3	104.9	111.0	97.4	98.5	94.8	100.0	102.4	92.9	86.3	87.1
107.1	98.9	103.3	100.1	98.7	98.7	100.0	98.4	95.6	92.8	92.0
103.7	102.0	100.0	99.8	98.7	99.5	100.0	97.5	96.5	97.3	110.8
111.4	108.2	104.9	99.7	98.8	98.8	100.0	82.4	91.0	92.4	99.4
131.6	123.7	101.5	107.5	102.6	100.7	100.0	92.9	89.2	85.6	123.7
77.6	80.2	86.0	98.5	94.9	101.7	100.0	104.1	115.4	114.3	130.1
107.8	100.1	95.6	97.9	98.3	100.0	100.0	79.2	77.5	77.0	137.0
85.6	88.8	91.9	100.6	100.6	100.6	100.0	156.8	147.7	150.0	157.5
110.4	107.3	102.7	100.0	99.4	99.2	100.0	96.4	94.1	95.0	108.4
103.2	103.5	102.4	100.3	100.6	100.2	100.0	99.9	98.4	98.0	100.1
107.8	106.9	105.1	103.9	102.3	102.5	100.0	97.9	96.2	95.8	90.6
120.2	112.6	107.3	103.4	102.7	99.9	100.0	91.5	88.7	85.1	123.8
71.8	82.6	86.6	82.8	91.0	85.1	100.0	112.0	119.2	121.6	144.1
99.1	98.8	98.5	97.6	98.6	100.0	100.0	98.5	94.9	92.8	116.7
109.9	106.3	102.4	98.4	99.2	100.3	100.0	104.6	99.3	99.3	38.3
108.4	106.6	104.5	102.6	101.6	101.9	100.0	98.6	96.2	95.5	95.4
98.0	91.5	100.8	102.5	173.4	100.9	100.0	98.7	95.3	98.5	99.2
90.6	89.8	101.7	102.5	103.2	101.4	100.0	97.3	88.0	86.6	87.9
65.8	69.5	107.4	108.2	103.3	100.3	100.0	97.3	102.3	102.9	103.6
109.7	91.8	94.6	98.8	97.7	100.3	100.0	104.2	112.1	130.3	131.5
127.2	123.5	99.8	100.4	101.1	99.4	100.0	98.4	110.2	113.5	113.1
121.5	111.9	109.0	106.5	103.8	99.9	100.0	96.4	101.8	116.6	118.4
93.0	91.4	103.1	103.6	193.1	101.0	100.0	97.3	92.0	92.3	93.3
95.8	96.7	98.8	98.2	98.3	99.5	100.0	101.4	101.3	100.8	101.4
101.9	102.7	103.9	99.1	100.3	100.0	100.0	100.6	99.8	99.6	95.5
89.9	89.6	88.7	103.8	100.9	99.6	100.0	100.2	102.8	101.2	101.5
86.9	87.9	97.2	95.9	96.9	101.1	100.0	102.3	107.3	107.5	112.5
108.8	110.4	89.3	89.6	99.5	101.0	100.0	104.4	97.7	86.9	102.0
94.9	95.6	95.3	99.8	90.8	93.2	100.0	102.7	98.0	96.2	110.2
99.4	100.4	99.3	99.0	98.8	99.0	100.0	101.2	99.7	99.1	98.7
	100.6	100.4	99.5	98.5	100.4	100.0	97.8	98.0	97.0	96.8
	109.4	110.4	108.6	103.8	102.6	100.0	99.1	92.8	88.3	88.7
	103.4	100.8	102.1	103.4	100.0	100.0	98.8	103.5	104.4	104.4
	83.7	80.3	79.2	83.8	95.9	100.0	93.8	108.7	115.9	115.1
	101.8	88.5	100.0	104.9	101.2	100.0	99.0	101.8	101.7	100.8
	105.6	105.8	104.2	100.0	99.5	100.0	98.5	98.1	97.2	98.4
	107.5	107.6	106.5	103.2	101.8	100.0	99.0	95.3	92.1	92.5

APPENDIX TABLE 2.V

"Calculated" per capita GDP[a] and the distribution of employment and GDP in twenty-nine market economies in 1960

Country	*Calculated per capita GDP*	*Share in GDP*			*Share in employment*		
		Industry and construction	*Agriculture*	*Services*	*Industry and construction*	*Agriculture*	*Services*
United States	2 244	38	4	58	33	7	59
Canada	1 772	39	7	54	35	12	53
Sweden	1 702	45	7	48	44	14	42
Australia	1 616	41	13	46	37	11	51
New Zealand	1 572	—	—	—	35	15	50
United Kingdom	1 556	48	4	48	48	4	48
Switzerland	1 477	—	—	—	49	11	39
Western Germany	1 411	53	6	41	48	14	38
Belgium-Luxembourg	1 390	43	7	50	45	7	48
Denmark	1 333	39	14	47	36	18	47
Netherlands	1 321	42	11	47	41	11	48
Norway	1 308	38	11	51	35	19	45
France	1 179	47	10	43	36	23	41
Finland	1 171	40	20	40	30	35	34
Austria	1 087	53	12	35	42	23	34
Ireland	919	30	25	45	24	36	40
Japan	806	37	15	48	29	32	39
Italy	796	39	15	46	37	29	33
Israel	762	34	12	54	32	17	50
Argentina	656	39	17	44	31	19	50
South Africa	616	33	18	49	28	30	43
Spain	558	32	27	41	31	41	28
Portugal	455	38	25	37	28	42	30
Greece	447	26	25	49	18	53	28
Mexico	437	33	19	48	19	54	27
Brazil	326	25	28	47	15	51	34
Turkey	266	22	42	36	10	75	15
Egypt	213	28	29	43	11	57	32
India	154	20	51	29	11	73	16

---

[a] "Calculated per capita GDP" figures are values expressed in terms of average 1963 prices obtained by the method described on page 8.

Chapter 3

GROWTH AND STRUCTURAL CHANGE IN THE WEST

The outline of the present chapter is as follows:

Section 3.1 is a general description of the approach adopted for western Europe, both to analysis of growth patterns in the period 1953-1967 and to the set of illustrative projections up to 1980.

Section 3.2 provides (p. 58) the empirical evidence for the basic hypothesis of an association between manufacturing growth rates and the level of income per head. It continues (p. 65) with the relations between growth of output, productivity and employment in manufacturing, and goes on (p. 70) with a set of projections of manufacturing output.

Section 3.3 first considers (p. 78) the general relationship between manufacturing growth and that of total GDP. It continues with an analysis of the main non-manufacturing sectors (p. 86), dealing separately, and at greater length, with the special cases of agriculture (p. 97) and public services (p. 111).

Section 3.4 is a review of some special features of development in southern Europe.

Section 3.5 brings together the analysis of the economy as a whole, and its major sectors, in terms of output, productivity and employment. It considers the trends in distribution of employment and the implications of the projections for future changes in total employment and its distribution between sectors.

3.1 BASIC HYPOTHESES AND METHOD OF APPROACH

Some basic propositions

Our analysis of the growth process in the west, covering the years 1953 to 1967, rests upon a pattern of reasoning which may first be set out in general terms as a guiding thread for following the more statistical account which follows.

(*a*) The growth of *manufacturing industry* is treated as the strategic element in economic development and as its principal determinant.

(*b*) There is a general tendency for rates of growth of manufacturing industry—and therefore, although in somewhat modified form, the growth rates of total product—to be slower, the higher the level of income per head.

The first of these propositions cannot be directly proved by the statistical observations presented here. The second can be statistically tested, and is subjected to such tests in later sections of this chapter; it will be shown to be an important element, although certainly not the only element, accounting for the differences in growth rates between different countries.

Some general and familiar reasons for the validity of these propositions can be put forward. As suggested already (in chapter 1), economies which are less mature industrially have the most to gain from technical progress, especially from the assimilation of existing technologies, and from economies of scale. The possibilities of attracting additional labour into expanding activities, often necessary for realising the economies of scale, depend in large part on the amount of underutilized labour available, particularly in agriculture (but the potential " reserve " of labour is not necessarily confined to the country's own boundaries).[1]

These elements in the growth process are particularly relevant to the rate of development of manufacturing industry, although they can well apply with some force to mining and energy, to construction, to some branches of transport, communication and distribution, and also to a few other branches of the service sectors. But it is in manufacturing industry that they appear to have their most comprehensive and strategic importance. They may well spread from manufacturing to other sectors. These are reasons for regarding manufacturing industry as the " motor " of the economy.

(*c*) From the two propositions described above is derived the treatment, in the present study, of the growth of the *non-manufacturing sectors*. Except for agriculture and public services, the growth of each sector is related to the growth of manufacturing industry. This implies that manufacturing is treated as the " determinant " sector in growth and the other sectors as " dependent ". The implication cannot be taken too literally. It is clear that growth of output in some non-manufacturing sectors can be independent of the growth of manufacturing (e.g. where international transactions are concerned, as for mining, transport or some services). The relationship between growth rates in the non-manufacturing and manufacturing sectors cannot in all cases be specified with much precision. But elements of a common pattern are found for important non-manufacturing sectors, and, also, a pattern of relationships between manufacturing growth and the growth of gross domestic product.

---

[1] For a much fuller exposition, see N. Kaldor, *Causes of the slow rate of economic growth in the United Kingdom* (Cambridge University Press, 1966), and A. Maddison *Economic Growth in the West* (Twentieth Century Fund, New York and London 1964).

The growth of *agricultural output* is treated as " exogenous ", because of the importance of the policy influences affecting it. In fact, for purposes of the present study projections of output made by the OECD, which appear broadly consistent with our projections for the whole economy, have been used. Nevertheless, from cross-country comparisons of the share of agriculture in the economy, related to income level, a certain pattern does appear, and is of some help in the assessment of projections.[2]

Output growth in the *public services* is also difficult to fit into any uniform pattern of relationships to the rest of the economy and is treated somewhat arbitrarily. Again, the influence of policy is obviously of great importance. But any systematic statistical treatment is impaired by the lack of comparability in definitions, and by the well enough known difficulties of estimation of real output.[3] (The latter difficulties also affect the treatment of some of the other service sectors.)

The line of reasoning suggested above provides a set of rough criteria, or " norms ", against which the experience of individual countries may be assessed, and some special features of development in individual countries illuminated. The general similarity of experience is marked among the *industrial* countries in western Europe and the advanced non-European market economies included in many of the comparisons (United States, Canada and Japan). Despite their substantial and obvious differences, these countries are all highly industrialized, relatively open economies, with a common interest in economic growth as a major policy objective, with not wholly dissimilar social aspirations, with a degree of mutual interdependence, and with broadly similar access to advanced technologies. This structural homogeneity justifies an attempt to find the outlines of a common pattern of growth.

The homogeneity does not extend so fully to the circumstances of the *southern* European market economies (Greece, Portugal, Spain, Turkey) or to Yugoslavia. Because of the relatively small manufacturing base at the beginning of the post-war period, the high dependence on agriculture of their employment and output structures, and the associated low income levels, these countries exhibit only in very general terms the common features of the western European growth pattern. The interpretation drawn from the experience of more industrialized economies, when expressed in quantitative relationships, cannot be applied with any useful degree of statistical precision to the southern European group. For these reasons, much of the main statistical analysis is applied only to the industrial west, although at many points the data for southern European countries are added for comparison. A section of the study (section 3.4 in this chapter) also gives a summary review of the special development patterns of the southern European countries.

It will be shown from the statistical tests that the experience of three countries, in particular, cannot well be fitted into some of the common patterns. These are the United Kingdom, Ireland and Turkey. The special features of the development of the British economy, responsible for its low growth rate in the past 15 years, need not be gone into here.[4] Ireland also presents special features differentiating its development from that of the other industrial western European countries with which it has, for convenience, been grouped. Turkey had to be omitted from most of the systematic calculations. One important reason is the absence of comparable statistics for manufacturing industry; but in addition the Turkish economic structure is such that it is difficult to find common patterns with the other south European countries when a key role in general economic development is attributed to the growth of manufacturing industry. For lack of a long enough series of data on manufacturing output, Switzerland also had to be omitted from much of the historical analysis. Although these countries—either for lack of data or because they showed very large deviations from the rest—had to be omitted from many (but not all) of the cross-country equations, the results of the equations for the remaining countries have, wherever it seemed useful, been applied to them for purposes of comparison.

Projections to 1980

The method of analysis applied to the experience of western Europe during the years 1953-1967 is used as a basis for illustrative projections of output up to the year 1980. The starting point is the income levels of 1965-1967; the key element in the projections is the growth rate of manufacturing output as determined by the statistical relationships between manufacturing growth and income levels exhibited by the analysis of the past. The projections for output growth in other sectors are mainly derived from their relationships to manufacturing growth. As in the historical analysis, however, the projections for agriculture and the public services are treated more pragmatically.[5]

The projections do not, however, represent a forcing of the individual national growth patterns into a rigid or uniform framework. It is recognized that the historical experience of each individual country does not always fit into this standard frame; in some cases the lack of concordance is substantial. The obvious and at present insoluble problem is to know whether the reasons for dissimilarity are to be regarded as persistent, or as associated with the particular period of past history which has been studied. A compromise is adopted between the theoretical but implausible concept of convergence to a common pattern, and the equally arbitrary assumption of the persistence of previous deviations.

---

[2] See page 101.

[3] For an examination of the public service sector, taken in this study to include health and education as well as general administration and defence, see page 111.

[4] Kaldor (*op. cit.*) explains it as a case of " premature maturity ", which is not, in general terms, inconsistent with the general approach adopted here.

[5] For agriculture, the projections are derived from national agricultural output projections published by the OECD (see pp. 105 ff.).

Once again, the special circumstances of the southern European countries demand a rather less systematic approach to projection.[6] But in view of the fast growth in these countries, it can reasonably be expected that, at least in some of them, their income levels and the main characteristics of their economic structures will soon be approaching the point at which the growth pattern of more industrial countries will become relevant.

The description of the simple analytical scheme that has been applied may appear almost to ignore what is often regarded as one of the basic determinants of any output projection, especially for an industrial country—namely the rate of growth of labour supply. The more usual method of projection is, certainly, to derive output growth from a labour supply projection based upon demographic forecasts and projections of activity rates, coupled with a projection of productivity gains which may be based, for example, on some form of production function.

The method used here by contrast treats output (in particular, manufacturing output) as exogenous. This method is not defended as theoretically or practically superior. But it may be justified by three considerations. First, considerable importance is attached to the elasticity of labour supply, which is regarded, within quite wide limits, as responsive to the rate and pattern of output growth. The elasticity derives not so much from the underlying demographic factors, which can be forecast with some assurance, but from the possible changes in activity rates and in the international movement of labour; both depend, at least in part, on the rate of growth of economic activity.[7] Secondly, importance is attached to the association between the rate of output growth and the rate of productivity growth. The causal chain is no doubt complex, but for present purposes it is the rate of growth of output which is regarded as determinant.

Thirdly, the use of a production function involves all the difficult questions of measuring capital inputs in a manner which is relevant to their influence on output; if used for projection, it also implies the prior projection not only of employment but also of the productive capacity of the capital stock, or at least of the rate of investment. This in itself presents a considerable problem (not in any case soluble at the stage so far reached by this study) and can be no less arbitrary than the simple methods used here.[8]

It must be emphasized, again, that the projections reported here are not to be regarded as best forecasts of the probable future, but as illustrating the application of one interpretation of growth patterns.

The outcome of the projections for the industrial western countries is a certain, although very moderate, slowing down in the growth rate of manufacturing industry. It may be suggested that this outcome is consistent not only with the general reasoning proposed above—such as the diminishing possibilities of returns to scale—but may also find justification in a certain current redirection of opinion and policy. The competitive pursuit of fast-growing physical output may be giving way to a more comprehensive view of economic and social progress. The objectives of social welfare, the building of a more efficient social infrastructure to support technological advance, the more equitable distribution of the fruits of progress, the allocation of more resources to preventing the congestion of cities and the deterioration and pollution of the physical environment—all these objectives are compatible with, and up to a point depend upon, the regular expansion of physical output, even in societies which are already rich. But they are not compatible with an excessive emphasis upon the conventional and at present rather one-sided macro-economic indicators of progress.

The post-war years have been, in most of the industrial countries, a period of growth of physical output faster than in any comparable span of time since the general establishment of the industrial system. There is no visible reason why this period of sustained growth should not continue. But a moderate slowing down in the pace of industrial expansion—and the projections put forward here represent only a very moderate deceleration—is in itself no barrier to faster economic and social progress conceived in a wider and more balanced sense.

Statistical notes

The following summary remarks apply to the statistical data and methods of analysis used in this chapter.

(*a*) The basic measure of total output volume is the gross domestic product (GDP) at factor cost, at 1963 prices.[9]

---

[6] See page 117.

[7] A detailed study of " The determinants of labour supply in Europe 1950-1980 " was published as chapter III of the *Economic Survey of Europe in 1968* and forms part of the present project on long term growth. The projections of labour supply in that study (with some revisions) have been incorporated in the present report.

[8] Apart from the difficulties of projecting independent variables, some more comprehensive scepticism about the analytical usefulness of some types of aggregative production functions has recently been expressed, particularly because of the inherent difficulties of measuring capital inputs. See papers by, among others, Sir John Hicks and N. Duane Evans read to the 1969 session of the International Statistical Institute, London, September 1969.

[9] Where original data relate to a different base year, the output of each sector has been converted to a 1963 time-base and the results summed.

(*b*) For structural analysis, GDP and employment are divided between the following major sectors:

Agriculture, forestry and fishing
Manufacturing
Mining and quarrying
Electricity, gas, water (or " public utilities ")
Construction
Transport and communications
Trade (or distribution)
Public services[10]
Miscellaneous services

Two warnings must be given:

First, this classification of activities is by no means identical between countries. In particular, the boundary between " public services " and " miscellaneous services " is drawn at different places. As will be seen, these differences in international practice impair precise international comparison.

Secondly, the sectoral analysis of output is generally drawn from the national data provided for the United Nations, *National Accounts Yearbook* and the annual *OECD National Accounts of OECD countries*, supplemented from other national sources. On the other hand, the sectoral analysis of employment has been drawn from diverse international and national sources and cannot in all countries be taken as completely comparable with the statistics of sectoral output. This necessarily affects comparability of productivity trends, but less so in the key sector of manufacturing than in some of the other sectors.

(*c*) *Adjusted GDP:* it is well enough known that inter-country comparisons at official exchange rates, although extensively used in the study, do not measure accurately the relative domestic purchasing power of currencies. Some experimental calculations of comparative real incomes per head have been made with alternative measures based on various " physical indicators " of the usage or output of selected commodities and services. This alternative measure is described as " adjusted " or " calculated " GDP per head. The methods used for selecting and combining these physical indicators are described in chapter 4 of this study. They are also drawn upon in chapter 2. The calculations were originally made for 1965, and at 1965 market prices; they have been carried back to 1953-1955 by applying indices of GDP at constant prices as measured in our basic data from national accounts. The resulting figures of adjusted GDP for 1953-1955 must be regarded as very tentative and are used in this chapter only to illustrate the effects of an alternative measure to that given by use of official exchange rates. The absolute figures (as given in table 3.1) cannot easily be compared with those based on official exchange rates: (i) because of the additional uncertainties introduced by carrying back the 1965 figures to 1953-1955 (ii) because the " adjusted " figures relate to 1965 prices, whereas our basic data are at 1963 prices (iii) because the " adjusted " figures represent GDP at market prices, while our basic data are at factor cost.

(*d*) For the *regression equations*, nine alternative mathematical forms of equation have usually been calculated. The equations presented generally represent the best-fitting from those tried (the best fit normally being taken as that yielding the lowest standard error of estimate).[11]

(*e*) The *trend rates* of change in output, employment, output per worker etc. have been calculated by least squares regression of annual data against time.

(*f*) The historical analysis covers the period from 1953 to 1967, but for a few countries, for some series, the full run of data was not available.

---

[10] Wherever practicable including public *and private* health and education services in addition to Public Administration and Defence.

[11] Use has also been made, for cross-country equations, of the unweighted average of the residuals for the countries covered by the equation. The σ given for each equation represents the *standard error of estimate* of the dependent variable (generally a percentage annual growth rate). The r is the linear correlation coefficient between the forms of the dependent and independent variables that are specified in each case.

3.2A COMPARATIVE INTERNATIONAL ANALYSIS OF MANUFACTURING GROWTH RATES

(i) The association between growth rates in manufacturing and levels of income per head

In the present section we test the validity of the hypothesis that growth rates of manufacturing, over the period 1953-1967, are inversely correlated with levels of income (gross domestic product) per head at the beginning of that period. The correlation can be tested in various ways. We can vary (*a*) the collection of countries for which the correlation is tested (*b*) the form of the equation and (*c*) the definition of income per head. The basic data used, and a variety of equations applied to them, are shown in table 3.1.[12]

The most general hypothesis tested is that a single relationship between manufacturing growth and income per head might apply to all European countries, east and west, and to industrialized countries outside Europe (United States, Canada and Japan). The results are displayed in chart 3.1 (part i) using as a measure of income the level of GDP per head in 1953-1955 at official exchange rates.[13] It is clear enough that the relationship holds; but it is so imprecise that it has little quantitative value as an explanation. Out of nine equations tried the best fitting was the following:

---

[12] For reasons already given, the historical equations reviewed in this section exclude data for Switzerland and Turkey. The United Kingdom and Ireland have also been omitted from some of the equations.

$$\text{Mfg growth rate} = 29.98 - 8.0047 \log \text{GDP/head} \qquad (3.1)$$
$$(r = 0.79;\ \sigma = 1.81)$$

Although over 60 per cent of the variations in the growth rate are statistically explained by variations in GDP/head at the beginning of the period, the standard error is too large for practical use. It means that there is only a 90 per cent probability of estimating the actual growth rate of manufacturing within a margin of as much as ± 1.8 percentage points. This equation yields substantially lower growth rates than those actually realized (positive residuals) for some east European countries at the lower end of the income scale, and for Japan, but large negative residuals for Greece, Portugal, the United Kingdom and Ireland, and smaller negative residuals for all industrial west European countries except western Germany and Sweden. The chart, however, does at once suggest that better-fitting relationships could be found—as might be expected—if groups of relatively homogeneous countries were considered separately.

If the hypothesis is applied to market economies only (industrial western Europe, southern Europe, United States, Canada and Japan, but omitting eastern Europe) a somewhat better fit is obtained, with a correlation coefficient of 0.91 and a standard error of 1.52. But if Japan, which has not much common growth experience with the southern European countries, is also left out, the fit improves considerably (chart 3.1 part ii). The best equation gives:

$$\text{Manufacturing growth rate} = 4.24 + \frac{1186.0771}{\text{GDP/head}} \qquad (3.2)$$
$$(r = 0.88;\ \sigma = 1.00)$$

The standard error, however, is still large, which can be attributed partly to the dispersion among the observations for the southern European countries, but also to the bad fits for the United Kingdom and Ireland.[14]

Equations with other combinations of countries were also tried and it was observed that the precision of the correlation is greatest when the number of countries included is smallest. This is in accordance with our initial expectation that the relationship should be clearest within a group of growth-homogeneous countries.

The most useful results and the most relevant for analysis of the industrial western European countries, are obtained from equations restricted to the observations for these countries only, together with United States, Canada and Japan (see chart 3.1 part iii). Two exclusions are, however, necessary: the United Kingdom and Ireland where the manufacturing growth rates in relation to their level of GDP/head fall far below the values for almost all other countries.[15] The effect of applying to these two countries the equation for the rest of the group is, however, shown in table 3.1.

Out of nine equations tried, the best fit is expressed by the following:

$$\log \text{manufacturing growth} = 0.59956 + \frac{147.9930}{\text{GDP/head}} \qquad (3.3)$$

($r = 0.94$; $\sigma = 0.64$. Unweighted average residual for all countries included in estimate, 0.47; for European countries only 0.49)

An almost equally good fit is found with the following equation, which because of its simpler arithmetic will be regarded as the " standard equation " for the present analysis, and will be used as a basis for projections:[16]

$$\text{Manufacturing growth} = 2.82 + \frac{2888.3074}{\text{GDP/head}} \qquad (3.4)$$

($r = 0.96$; $\sigma = 0.74$. Unweighted average residual for all countries included in estimate 0.49; for European countries only = 0.52)

As table 3.1 shows, the differences between these two equations are significant in very few countries.

Equation 3.4, which is illustrated in chart 3.1 part iii, explains statistically about 90 per cent of the intercountry variations in manufacturing growth rates. The size of the standard error of estimate means that there is a 90 per cent probability of estimating the manufacturing growth rate within a margin of about ± 0.75 percentage points. (In fact, the three largest residuals, for the 13 countries included in the equation, are 1.6, 1.2 and 0.9 percentage points.) But for the United Kingdom, the manufacturing growth rate is 2 percentage points below the value calculated from the observations for the other 13 countries, and for Ireland nearly 3 points. The form of the equation stresses the fact that the influence of income per head is greatest at the fastest growth rates (that is, at the lower levels of income per head).

---

[13] For the purpose of this table, income (GDP) per head is measured at official exchange rates for all market economies, and by " calculated " or " adjusted " GDP per head for eastern European countries.

[14] If the United Kingdom and Ireland are also excluded from the estimates we obtain the following, better fitting, equation for a group of countries thus consisting of southern Europe, industrial western Europe (excluding the United Kingdom and Ireland), Canada, the United States:

$$\log \text{mfg growth} = 1.77891 - 0.3405 \log \text{GDP/head} \qquad (3.2a)$$
$$(r = -0.92;\ \sigma = 0.77)$$

But the dispersion among the southern countries is great (unweighted average residual 0.9).

[15] It will be seen below that the exceptional relationships in both countries are somewhat less marked when the alternative measure, of " adjusted " GDP per head, is used.

[16] The fit of equation (3.4) is about as good as that of (3.2*a*) which included southern Europe but excluded Japan. However the wide dispersion of the south European countries would have an undue influence on the use of equation (3.2*a*) for projecting growth rates of the industrial countries.

TABLE 3.1

Manufacturing growth rates in 1953-1967 related to GDP per head of population in 1953-1955

		GDP per head 1953-1955		*Growth rate of manufacturing 1953-1967 (per cent a year)*										
		At exchange rate [a, b] US $	*Adjusted [c] US $*		*Estimated from equations*					*Residuals: Actual less estimated growth rates*				
				Actual	*(3.1)*	*(3.2)*	*(3.3)*	*(3.4)*	*(3.5)*	*(3.1)*	*(3.2)*	*(3.3)*	*(3.4)*	*(3.5)*
Countries covered by equation [d] —														
Industrial western Europe excluding United Kingdom and Ireland					x	x	x	x	x					
United Kingdom and Ireland					x	x			x					
Southern Europe					x	x								
United States, Canada and Japan					x	x (excl. Japan)	x	x	x					
Eastern Europe					x									
GDP per head used in equation														
Exchange rate [b]					x	x	x	x						
Adjusted [c]									x					
Industrial market economies														
Austria	A	608	831	6.0	7.7	6.2	7.0	7.6	6.7	−1.7	−0.2	−1.0	−1.6	−0.7
Belgium	B	1 032	1 259	5.3	5.9	5.4	5.5	5.6	4.8	−0.6	−0.1	−0.3	−0.4	0.5
Denmark	DK	1 088	1 133	5.6	5.7	5.3	5.4	5.5	5.2	−0.1	0.2	0.1	0.1	0.4
Finland	SF	922	945	6.0	6.3	5.5	5.8	6.0	6.0	−0.3	0.4	0.2	−0.0	−0.0
France	F	1 069	957	5.5	5.7	5.3	5.5	5.5	5.9	−0.2	0.1	0.0	0.0	−0.4
Western Germany	WG	954	987	6.8	6.1	5.5	5.7	5.8	5.7	0.7	1.3	1.1	0.9	1.0
Italy	I	549	687	8.0	8.1	6.4	7.4	8.1	8.2	−0.1	1.6	0.6	−0.1	−0.3
Netherlands	NL	846	1 062	5.9 [e]	6.6	5.6	5.9	6.2	5.4	−0.6	0.3	−0.0	−0.3	0.6
Norway	N	1 100	1 074	4.8	5.6	5.3	5.4	5.4	5.4	−0.8	−0.5	−0.6	−0.6	−0.5
Sweden	S	1 434	1 372	6.0	4.7	5.1	5.0	4.8	4.6	1.3	1.0	1.0	1.2	1.5
United Kingdom	GB	1 183	1 421	3.2	5.4	5.2	(5.3)	(5.3)	4.5	−2.2	−2.1	(−2.1)	(−2.1)	−1.2
Ireland	IRL	556	973	5.1	8.0	6.4	(7.3)	(8.0)	5.8	−2.9	−1.3	(−2.2)	(−2.9)	−0.7
Switzerland [d]	CH	1 391	1 316	(4.3) [f]	(4.8)	(5.1)	(5.1)	(4.9)	(4.7)	.	.	.	.	.
Canada	CDN	1 630	1 358	5.0	4.3	5.0	4.9	4.6	4.5	0.7	0.1	0.1	0.4	0.4
Japan	J	264	481	14.3	10.6	.	14.5	13.8	13.7	3.7	.	−0.2	0.5	0.6
United States	USA	2 542	1 769	3.8	2.7	4.7	4.5	4.0	4.0	1.1	−0.9	−0.8	−0.2	−0.2

Southern Europe														
Greece	GR	317	401	8.0	10.0	8.0	..	..	..	−2.0	0.1	..	..	..
Portugal	P	215	423	8.2	11.3	9.8	..	..	..	−3.1	−1.6	..	..	..
Spain [g]	E	340	534	8.7	9.7	7.7	..	..	..	−1.0	1.0	..	..	..
Yugoslavia	YU	172	289	11.7	12.1	11.1	..	..	..	−0.4	0.6	..	..	..
Turkey [d]	TR	178	211	5.8	..	..	..	..	..					
Eastern Europe														
Bulgaria [b]	BG	391		13.4	9.2	..	..	..	..	4.2	..	..	..	..
Czechoslovakia [b]	CZ	828		6.6	6.6	..	..	..	..	−0.0	..	..	..	..
Eastern Germany [b]	EG	716		7.8	7.1	..	..	..	..	0.7	..	..	..	..
Hungary [b]	H	564		7.0	8.0	..	..	..	..	−1.0	..	..	..	..
Poland [b]	PL	542		8.4	8.1	..	..	..	..	0.3	..	..	..	..
Romania [b]	R	318		12.6	10.0	..	..	..	..	2.6	..	..	..	..
USSR [b]	SU	528		9.9	8.2	..	..	..	..	1.7	..	..	..	..
Correlation coefficient (r)										0.79	0.88	0.94	0.96	0.90
Standard error of estimate (σ)										1.81	1.00	0.64	0.74	0.77
Unweighted average residual										1.31	0.73	0.45	0.49	0.61
for all countries in equation for industrial west European countries in equation										0.96	0.75	0.49	0.52	0.65

NOTES. — *Equations for determination of manufacturing growth rate:*

(3.1) $\text{Growth rate} = 29.98 - 8.0047 \log \text{GDP/head}$

(3.2) $\text{Growth rate} = 4.24 + \dfrac{1186.0771}{\text{GDP/head}}$

(3.3) $\text{Log growth rate} = 0.59956 + \dfrac{147.9930}{\text{GDP/head}}$

(3.4) $\text{Growth rate} = 2.82 + \dfrac{2888.3074}{\text{GDP/head}}$ (" Standard equation ")

(3.5) $\text{Log growth rate} = 0.40162 + \dfrac{352.9573}{\text{adjusted GDP/head}}$

The correlation coefficient r measures the correlation between Y (the manufacturing growth rate) and X (GDP/head) in the equation $Y = a + bX$, where Y and X have the various forms specified above.

The growth rate is the percentage least square trend of output over the period 1953 to 1967. The GDP per head is expressed in US $.

Figures in brackets are the results of applying the equation to countries not included in the estimate.

[a] At 1963 factor cost.

[b] For eastern Europe, " adjusted " GDP per head estimates at 1965 market prices.

[c] See text page 58.

[d] Switzerland and Turkey are excluded from all equations, for reasons given in the text.

[e] Throughout this study, the trend value for the growth of manufacturing output in the Netherlands is given as 5.9 per cent a year. Some difficulty was found in calculating a continuous series consistent with the national accounts. Subsequent inquiries show that an alternative and superior method would result in a trend value of 6.3 per cent a year.

[f] Average for last six years.

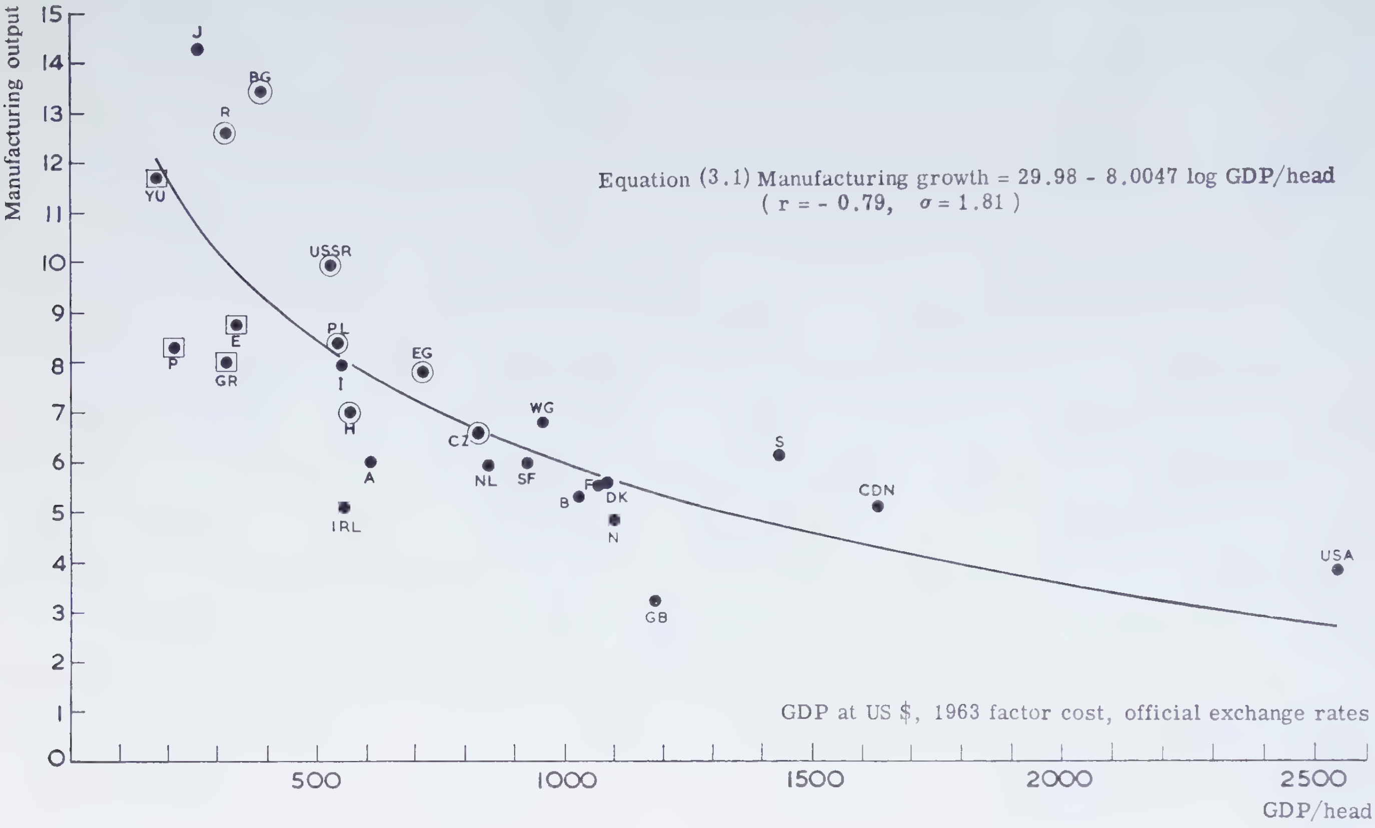
[g] Growth rates for 1954 to 1967. GDP/head relates to 1954.

CHART 3.1

Manufacturing growth rate 1953-1967 as a function of the level of GDP/head 1953-1955

(Least square trend growth rates of manufacturing output volume (annual percentage change)

Part 1: All countries



Part 2: Market economies, excluding Japan

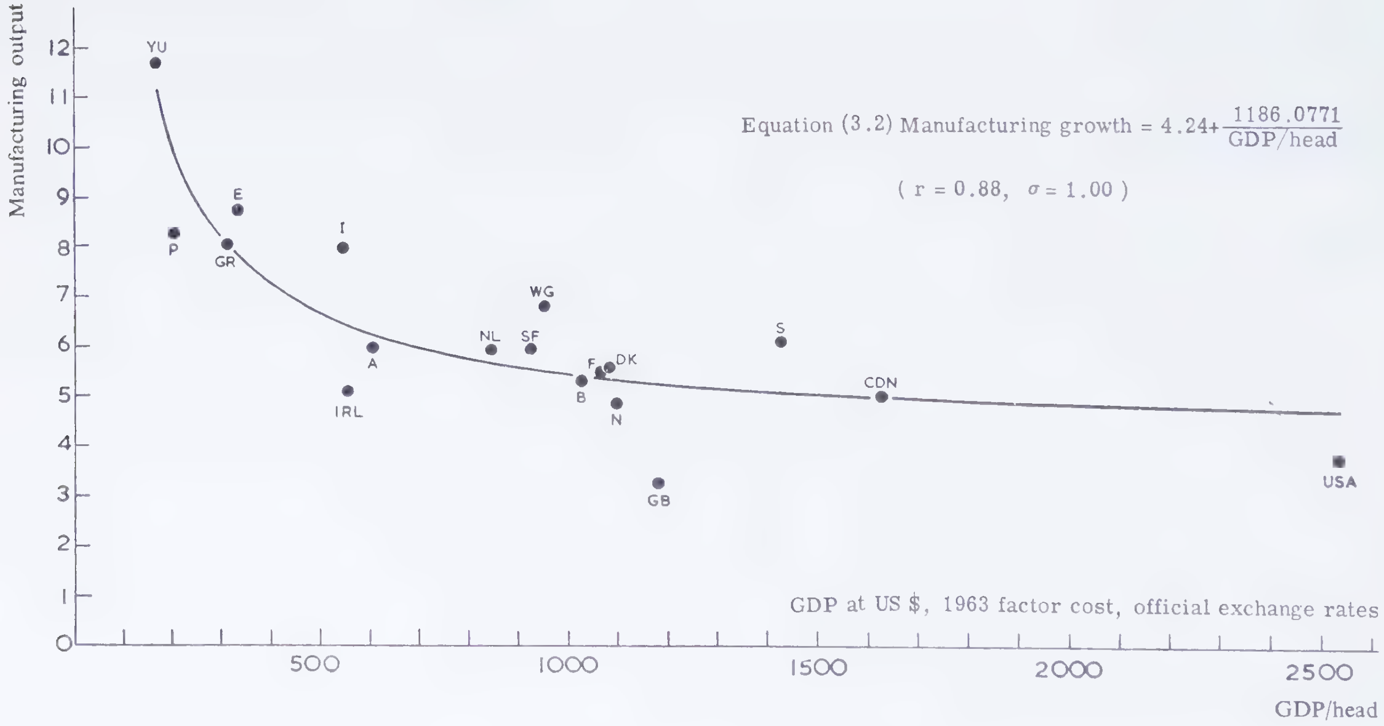
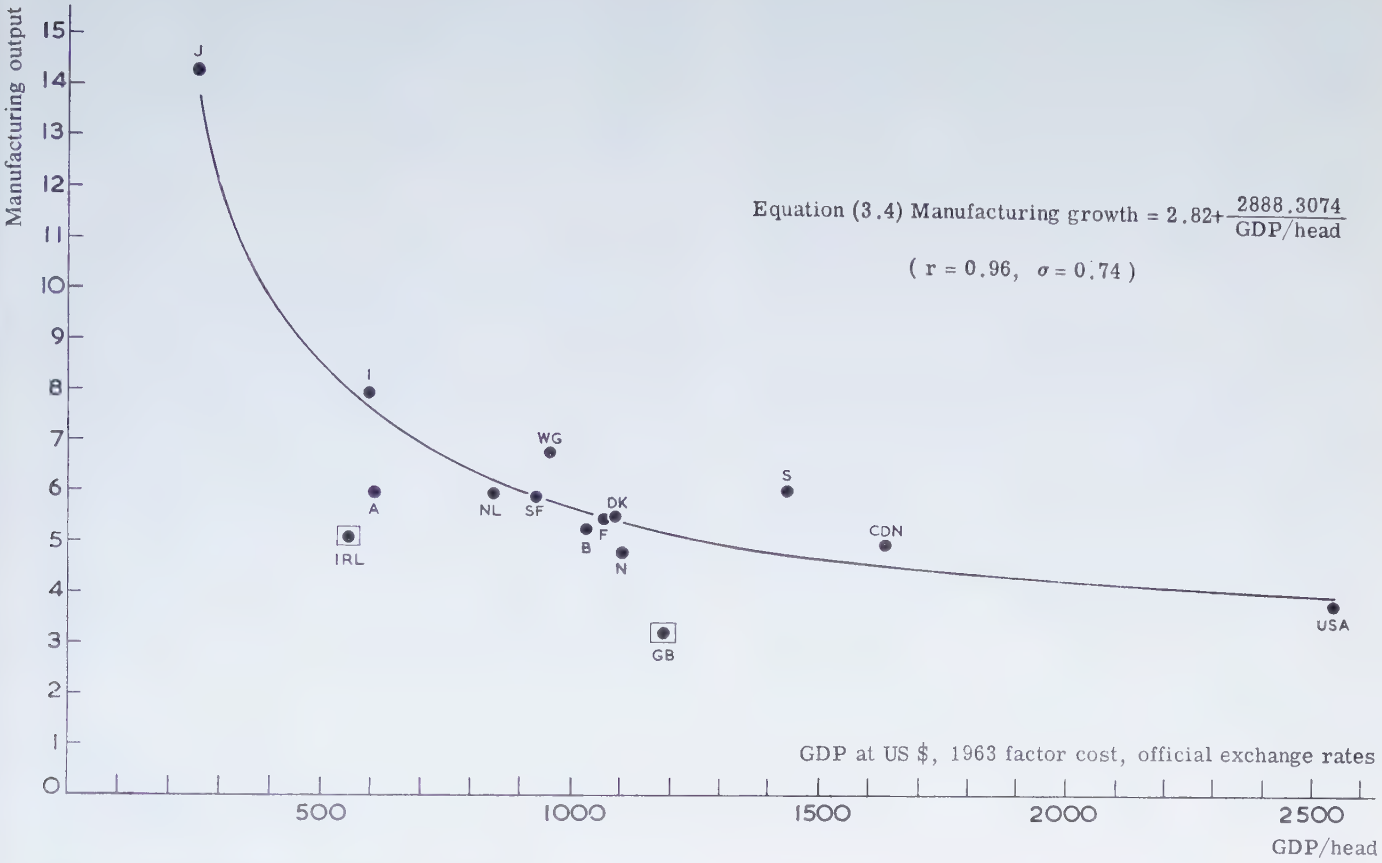
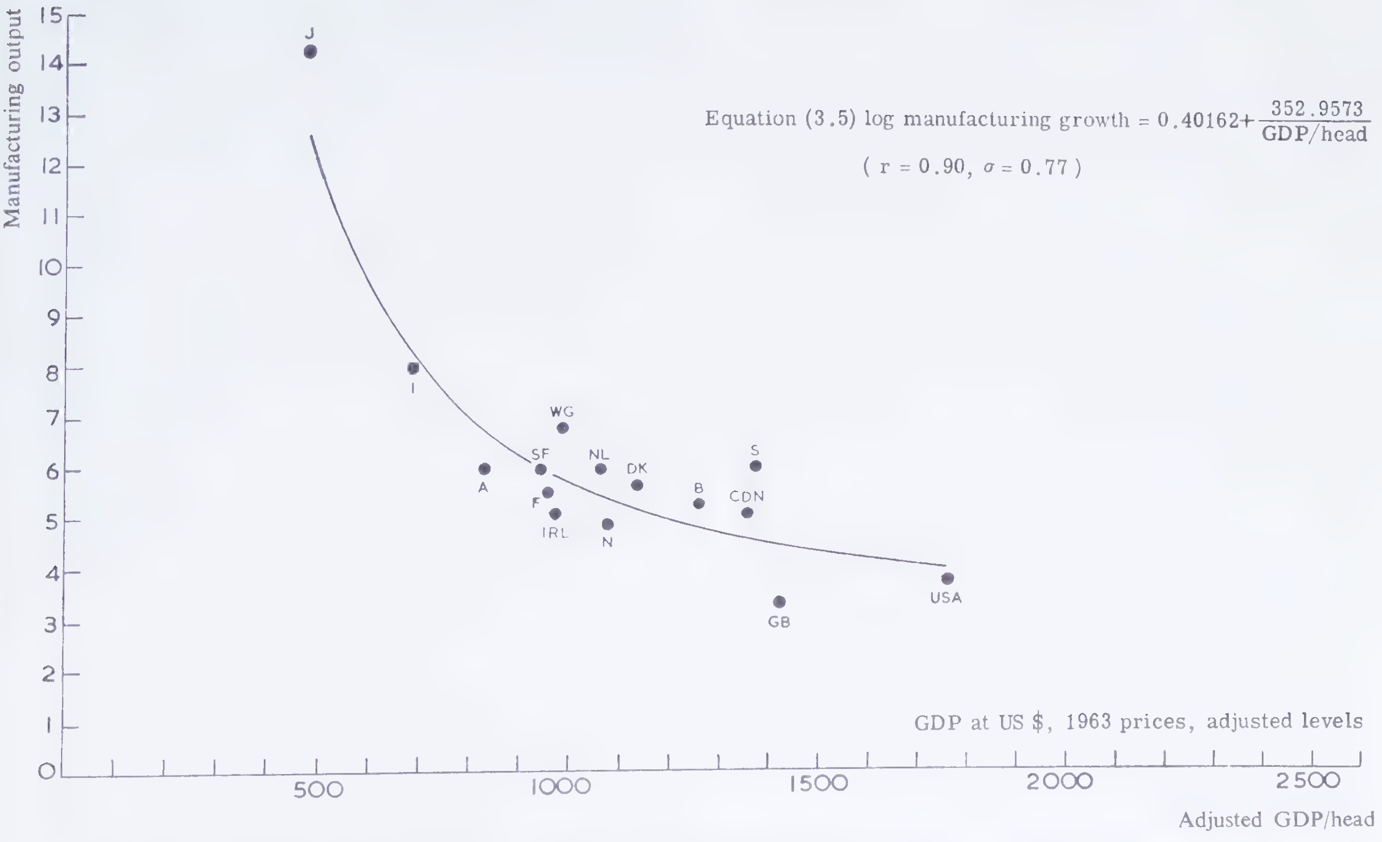


CHART 3.1 *(continued)*

Part 3: Industrial western Europe, Canada, Japan and the USA



Part 4: Industrial western Europe, Canada, Japan and the USA



NOTE.— United Kingdom and Ireland not included in equation (3.4). Countries denoted according to car licence plates, except for eastern and western Germany (EG, WG). See text for explanation of the adjustments of GDP-levels in part 4. In part 1 a circle denotes eastern european countries and square southern european countries.

A possible criticism of equation 3.4 is that the shape of the curve may seem to be heavily influenced by the positions of Japan and Italy, the countries with the lowest incomes per head among those included. But equations (3.1) and (3.2), covering southern and/or eastern European countries with levels of income within the same range as Japan and Italy yielded equations with *approximately* the same shape of curve, although with much less precision and with different degrees of steepness (a steeper decline with income when eastern Europe is included, less steep when southern Europe is included).[17]

An alternative measure of income per head

The measure so far used of relative income per head at the starting point (1953-1955) is derived from conversion of GDP into dollars at official exchange rates. Since relative incomes at official exchange rates can in some cases be a poor measure of comparative purchasing power, the alternative experimental measures of real incomes, described as " adjusted GDP per head ", carried back to 1953-1955, have also been correlated with rates of manufacturing growth.[18]

One of the main differences between these estimates of adjusted GDP per head, and the estimates at official exchange rates, is that the income per head of the United Kingdom in shown as somewhat higher in relation to that of the other industrial western European countries. Consequently it becomes possible to incorporate the United Kingdom, and for similar reasons Ireland, in an equation without serious loss of precision.

The best fitting correlation between the adjusted 1953-1955 GDP per head and the growth rate of manufacturing, covering (as in equations (3.3) and (3.4)) industrial western Europe, the United States, Canada and Japan, but in addition including the United Kingdom and Ireland, is given by the equation:

$$\log \text{mfg growth rate} = 0.40162 + \frac{353.9573}{\text{adjusted GDP per head}} \qquad (3.5)$$

$$(r = 0.90;\ \sigma = 0.77)$$

The curve is shown in chart 3.1 part iv.

The precision of the equation is slightly inferior to that of equation (3.3) and similar to that of the standard equation (3.4)—both based on GDP at official exchange rates.[19] The important observation however is that the curve of equation (3.5) has a considerably steeper slope than that of equation (3.4), strengthening the tendency for growth rates to fall as real incomes rise. Manufacturing growth rates fall faster with increases in adjusted GDP per head than with GDP per head at official exchange rates, although this tendency is weakened at higher income levels.

General conclusions

Some general conclusions may be drawn from the series of equations described above. First, the existence of a relationship between the level of income per head and the growth of manufacturing output is firmly established. Secondly, the relationship is not wholly dependent on a small number of strategic observations. Thirdly, the precision of the relationship is considerably greater when the countries are more homogeneous in respect of level of development and economic structure. A small group of countries is likely to exhibit greater homogeneity than a large one, but a small group will also be more sensitive to " special factors " affecting individual countries; a high degree of precision cannot therefore be expected. Nevertheless, the relationships found do illuminate one aspect of development in the past and provide one approach to consideration of possible future trends.

National deviations: industrial west

We can now identify the industrial countries where manufacturing growth rates show marked divergencies from the general pattern—suggesting that strong special factors have influenced these growth rates. (In judging the significance of the divergence, or residual, it may be recalled that the standard error of estimate in our " standard equation " (3.4) is equal to 0.74 per cent of annual manufacturing growth).

The west European countries with marked *positive* residuals are:

Sweden: actual growth rate 1.2 per cent more than the calculated value (4.8)

Western Germany: actual growth rate 0.9 per cent more than the calculated value (5.8)

The " excess " growth rates in Sweden and western Germany appear in all five equations in table 3.1. It must be observed that in western Germany the underlying growth rate appears to have slowed down considerably in the 1960s; the average growth rate in 1960-1967, influenced, however, by the recession in 1966-1967 and subsequent recovery was less than 5 per cent a year. Western Germany is one of the very few industrial western European countries where there is clear evidence of a change in underlying trends of manufacturing growth during the period 1953-1967 (see below). Italy also shows evidence of some " excess " growth in equation (3.3) although not in the standard equation (3.4).

Countries with marked *negative* residuals are:

Austria: actual growth rate 1.6 per cent less than the calculated values (7.6)

Norway: actual growth rate 0.6 per cent less than the calculated value (5.4)

---

[17] That a relationship holds even when Japan is excluded is shown also by the following equation, covering industrial western Europe excluding the United Kingdom and Ireland but including the United States and Canada (i.e. the same country coverage as in equation 3.4 except for the omission of Japan):

$$\frac{1}{\text{mfg growth}} = 0.117, + 0.055\ \text{GDP/head in \$000.} \qquad [3.4a]$$

$r = 0.86;\ \sigma = 0.67.$

[18] For a brief description of the adjusted GDP figures, and some warnings about their use, see page 58.

[19] If the United Kingdom and Ireland are excluded from equation (3.5), the correlation coefficient rises to 0.93, and the standard error is reduced to 0.71; thus the result remains rather less precise than in equation (3.3).

Belgium: actual growth rate 0.4 per cent less than the calculated value (5.6)

Moreover, when equation (3.4) is applied to the United Kingdom and Ireland (omitted from its calculation), still larger residuals appear:

United Kingdom: actual growth rate 2.1 per cent less than the calculated value (5.3)

Ireland: actual growth rate 2.9 per cent less than the calculated value (8.0)

" Deficient " growth rates for the United Kingdom and Ireland appear whichever equation is applied, but for the United Kingdom they are much less marked against equation (3.5), based on " adjusted GDP per head " and including both countries in the calculation, Markedly " deficient " growth rates in Austria and Norway also appear in all five equations. In Norway and Ireland, there is evidence, given below, that the underlying growth rate has accelerated since the late 1950s. But in Austria, it has probably been slowing down still further.

None of the equations described yields a satisfactory explanation of the manufacturing growth rates in most of the *southern European* market economies—whether or not the data for these countries have been incorporated in the calculations.[20] The evidence of the different equations is conflicting; and the conclusion must be that growth patterns derived from calculations in which more advanced countries predominate do not provide a suitable framework for explaining growth in southern Europe. These countries are, however, now approaching levels of income per head more comparable than fifteen years ago with those of the more advanced countries; thus the equations may not be without value as indicators of prospective growth rates in southern Europe.

(ii) Output, productivity and employment in manufacturing: industrial west

Growth rates of manufacturing productivity vary among the industrial western countries about as widely as growth rates of output. Against an unweighted mean of 4.6 per cent a year, two countries are distinguished by remarkably fast growth rates of productivity in 1953-1967—Japan (nearly 10 per cent a year) and Italy (6 per cent). At the other extreme are the United Kingdom, Canada, the United States and Denmark—all around 3 per cent. The remaining eight countries are found in a cluster with annual productivity gains of between about 4 per cent (Norway) and 5 per cent (Sweden). (See table 3.2.)

Variations in employment growth are relatively wider.[21] Against an unweighted mean of 1.5 per cent a year, Japan again is a long way ahead (over 4 per cent). Denmark and Canada come next with increases of over 2 per cent a year, with Finland, western Germany and Italy not far behind (at just under 2 per cent). The United Kingdom (0.5 per cent) and the United States (0.7 per cent) had the smallest increases, while the rest cluster around 0.8 to 1.2 per cent.

Can these diverse trends in manufacturing output, productivity and employment be fitted into a common pattern ? And can they be related, in broad terms, to the pattern of relationship between output growth and income levels already described ?

Fairly close relationships can in fact be seen between the growth of manufacturing output on the one hand and, on the other, the growth of productivity and employment in manufacturing. The correlation between a fast growth of output and a fast growth of productivity is in itself a familiar and well-established proposition.[22] From it, and from the corresponding relationship between output and employment, it is possible to see whether it is an exceptional growth in productivity, or an exceptional growth in employment, that is associated with markedly high, or markedly low, growth rates in output.

A cross-country correlation between output growth in 1953-1967, and the growth of productivity and of employment, results in the following linear equations for the industrial market economies[23] (see table 3.2 and chart 3.2):

$$\text{Productivity growth} = 0.67 + 0.6352 \text{ output growth} \qquad (3.6)$$
$$(r = 0.95;\ \sigma = 0.57)$$

$$\text{Employment growth} = -0.52 + 0.3278 \text{ output growth} \qquad (3.7)$$
$$(r = 0.85;\ \sigma = 0.56)$$

The size of the standard deviation is considerably affected by the rather large residuals for Denmark and Canada. Both countries show very low rates of growth of manufacturing productivity, and high growth of employment, in relation to their growth of output. And it may be observed that these are two countries which have depended more than most for their economic development on the building up of modernised and efficient agricultural and (in Canada) mining sectors, as well as upon industrialization. Exclusion of Denmark and Canada results in the following relationships:

$$\text{Productivity growth} = 1.01 + 0.6100 \text{ output growth} \qquad (3.6a)$$
$$(r = 0.99;\ \sigma = 0.32)$$

$$\text{Employment growth} = -0.85 + 0.3524 \text{ output growth} \qquad (3.7a)$$
$$(r = 0.96;\ \sigma = 0.31)$$

---

[20] Equations based on the adjusted GDP estimates for southern European countries also produced unsatisfactory results.

[21] The mean deviations, expressed as percentages of the unweighted mean growth rates, are: for output 2.4 per cent, for productivity 2.2 per cent and for employment 5.3 per cent

[22] One of the first statistical tests of a detailed kind, showing positive correlation between output and output per head as between manufacturing branches in the United Kingdom, is to be found in W.E.G. Salter " Productivity and technical change " (Cambridge University Press, second edition 1969). Its application to inter-country comparisons among industrial market economies has been developed by N. Kaldor (" Causes of the slow rate of economic growth in the United Kingdom " Cambridge University Press 1968), with which the present analysis has much in common.

[23] Industrial western Europe (including United Kingdom but excluding Ireland) United States, Canada and Japan.

CHART 3.2

Output, productivity and employment growth 1953-1967 in manufacturing

(Annual percentage changes between 5-year moving averages)

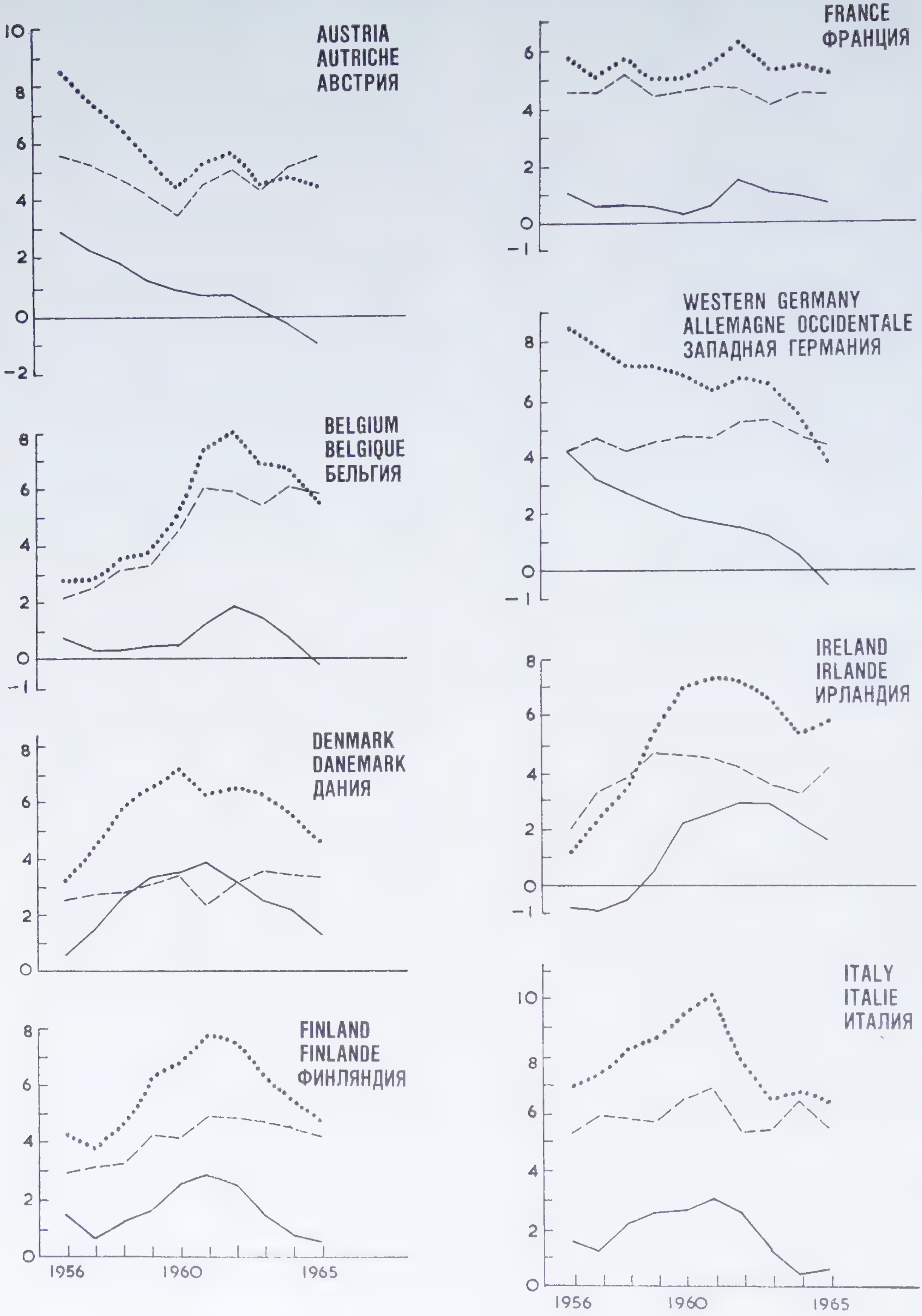


CHART 3.2 *(continued)*

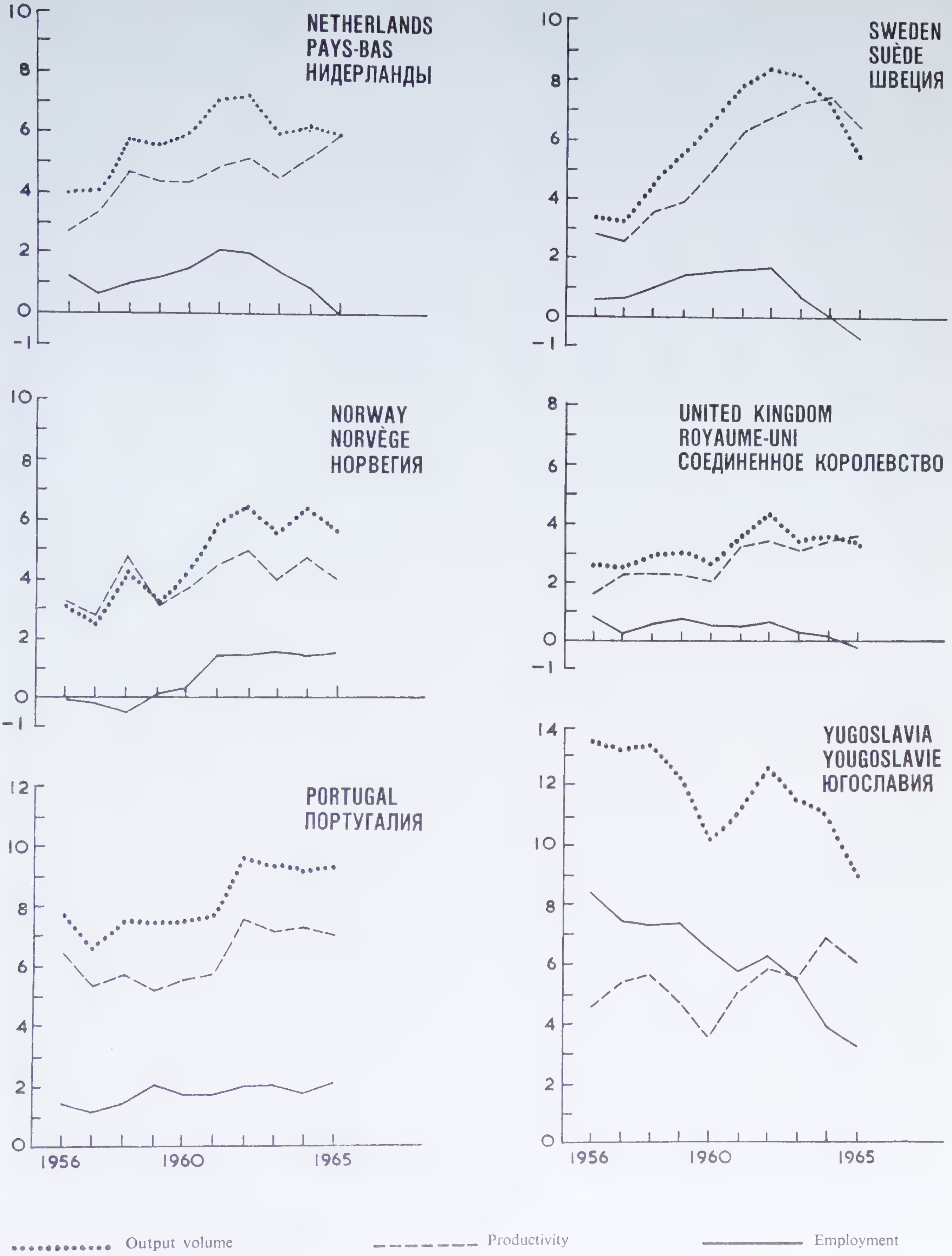


TABLE 3.2

Productivity and employment in manufacturing as a function of manufacturing output

(Annual percentage changes; Residual = observed minus estimated change)

	Productivity					Employment				
		Estimated		Residuals			Estimated		Residuals	
Country	Observed change 1953-1967	in main equation [a]	in alternative equation [b]	in main equation	in alternative equation	Observed change 1953-1967	in main equation [c]	in alternative equation [d]	in main equation	in alternative equation
Austria	4.9	4.5	4.7	0.4	0.3	1.0	1.4	1.3	−0.4	−0.3
Belgium	4.5	4.0	4.2	0.5	0.3	0.8	1.2	1.0	−0.5	−0.3
Denmark	3.1	4.2		−1.1		2.4	1.3		1.1	
Finland	4.1	4.4	4.6	−0.3	−0.5	1.8	1.4	1.2	0.3	0.5
France	4.7	4.2	4.4	0.6	0.4	0.8	1.3	1.1	−0.5	−0.3
Western Germany	4.8	5.0	5.2	−0.2	−0.4	1.9	1.7	1.5	0.2	0.4
Italy	6.0	5.7	5.9	0.3	0.1	1.8	2.1	1.9	−0.2	−0.1
Netherlands	4.6	4.4	4.6	0.2	0.0	1.2	1.4	1.2	−0.2	−0.0
Norway	4.0	3.7	4.0	0.3	0.1	0.8	1.1	0.8	−0.3	−0.1
Sweden	5.1	4.5	4.7	0.6	0.4	0.9	1.5	1.3	−0.6	−0.4
United Kingdom	2.7	2.7	3.0	−0.0	−0.3	0.5	0.5	0.3	−0.0	0.2
Canada	2.8	3.9		−1.1		2.2	1.1		1.1	..
Japan	9.6	9.8	9.7	−0.1	−0.1	4.3	4.2	4.2	0.1	0.1
United States	3.1	3.1	3.3	0.0	−0.2	0.7	0.7	0.5	−0.0	0.2

[a] Productivity growth = 0.67 + 0.6352 output growth ($r = 0.95$, $\sigma = 0.57$). Equation (3.6).

[b] Productivity growth = 1.01 + 0.6100 output growth ($r = 0.99$, $\sigma = 0.32$). (Denmark and Canada excluded). Equation (3.6a);

[c] Employment growth = −0.52 + 0.3278 output growth ($r = 0.85$, $\sigma = 0.56$). Equation (3.7).

[d] Employment growth = −0.85 + 0.3524 output growth ($r = 0.96$, $\sigma = 0.31$). (Denmark and Canada excluded). Equation (3.7a);

Although the omission of Denmark and Canada significantly improves the reliability of the equations, it does not greatly affect their application to the other countries. Thus in the following analysis equations (3.6) and (3.7), covering all industrial market economies, will be used.[24]

Equation (3.6) means that in manufacturing industry productivity can be taken to increase independently of the rise in output by about 0.7 per cent a year plus just over 0.6 per cent a year for each percentage point of output growth. The reciprocal of this proposition, as shown by equation (3.7), is that employment can be taken to fall by about 0.5 per cent a year if there is no increase in output, offset by a rise of just over 0.3 per cent a year for each percentage point increase in output;[25] thus at a rate of growth of output of about 1½ per cent a year employment should remain constant. For given rates of growth in manufacturing output, the increases in productivity and employment should then be as follows:

	Per cent a year	
Output	Productivity	Employment
1	1.30	−0.19
2	1.94	0.14
3	2.57	0.46
4	3.21	0.79
5	3.84	1.12
6	4.48	1.45
7	5.11	1.78
8	5.76	2.10

The equations give estimates of annual growth rates in both productivity and employment which are within about ½ percentage points of the recorded figure, except for Denmark and Canada (see table 3.2). Indeed, only four of the remaining twelve countries show residuals in excess of 0.3 either for productivity or for employment, against an unweighted average increase in productivity of 4.8 per cent, and in employment of 1.4 per cent.

The good fit and high explanatory value of these equations makes it reasonable to regard them as expressing a characteristic or "normal" pattern of productivity and employment growth in relation to output growth, for manufacturing industry in industrial market economies. This pattern can then be represented by three equations:

Normal output growth associated with the level of GDP per head—equation (3.4)

---

[24] The discussion of these relationships by Kaldor based on similar but not identical statistics (N. Kaldor, *op. cit.* p. 12) showed somewhat larger constants and somewhat smaller coefficients than those in equation (3.6) and (3.7)—in fact rather close to equations (3.6*a*) and (3.7*a*).

[25] That the constants in the two equations do not precisely cancel out, and that the coefficients do not add to 1, is an indication of the approximative nature of the relationships.

Normal productivity growth associated with output growth—equation (3.6)

Normal employment growth associated with output growth—equation (3.7)

National deviations in productivity and employment growth

Comparison between the normal equations and actual developments makes it possible to divide the national deviations of output growth pattern between deviations in productivity growth and deviations in employment growth, as follows:

National residuals from normal pattern of manufacturing growth 1953-1967

	Growth of output estimated from equation	*Residual on output equation* [a]	*Residual attributable to*	
			Productivity [b]	*Employment* [c]
Austria	7.6	−1.6	−0.6	−1.1
Belgium	5.6	−0.4	+0.3	−0.5
Denmark	5.5	+0.1	−1.1	+1.1
Finland	6.0	−0.0	−0.4	+0.3
France	5.5	−0.0	+0.5	−0.5
Western Germany	5.8	+0.9	+0.4	+0.5
Ireland	(8.0)	(−2.9)	(−2.0)	(−0.9)
Italy	8.1	−0.1	+0.2	−0.3
Netherlands	6.2	−0.3	0.0	−0.3
Norway	5.4	−0.6	−0.1	−0.5
Sweden	4.8	+1.2	+1.5	−0.2
United Kingdom	(5.3)	(−2.1)	(−1.3)	(−0.7)
Canada	4.6	+0.4	−0.8	+1.1
Japan	13.8	+0.5	+0.2	+0.3
United States	4.0	−0.2	−0.1	−0.1

[a] Excess of actual growth of output over that associated by equation (3.4) with the level of GDP/head.

[b] Excess of actual growth of productivity over that associated by equation (3.6) with the calculated growth of output.

[c] Excess of actual growth of employment over that associated by equation (3.7) with the calculated growth of output.

The three countries showing marked " excess " growth of output according to equation (3.4) are Sweden, western Germany and, less certainly, Japan. In western Germany and Japan, this was associated with excess growth of both productivity and employment. But in Sweden, it is quite clear that the special feature was the very fast relative growth of productivity. The countries showing marked " deficient " growth of output are Austria, Norway, the United Kingdom and Ireland. In Norway, the growth of productivity was very little less than could be expected, given the rate of output increase; the special feature was the small increase in manufacturing employment. In Austria, the small increase in employment made the largest contribution to the small increase in output, but productivity growth was also relatively slow. In the United Kingdom and Ireland, by contrast, the relative increases in both productivity and employment were small, but it is the deficiency in productivity growth that is most clearly associated with the slow relative growth of manufacturing output.[26]

In some of the other countries, where the output growth rate fits the equation well, there are marked, but mutually compensating, deviations in productivity and employment. Thus Denmark and Canada, as already observed, show very small productivity gains but output increased more or less normally because of fast increases in employment. Elsewhere the fit for all three equations was fairly good (within ½ per cent a year or less) but some significance may be attached to the relatively fast growth of productivity in France (a positive residual of ½ per cent) with an accompanying deficient growth of employment.

It should be noted that productivity is here measured in terms of annual output per worker. No attempt has so far been made to correct the figures for changes in annual hours worked or for changes in the proportion of part-time workers. In most of the industrial countries annual hours worked have probably fallen by rather similar rates (from about ½ per cent to about 1 per cent a year). A possible exception is France, where the reduction in average hours may have been insignificant, which helps to explain the exceptionally fast growth of annual productivity. In Japan and the United States, also, there has been little change in annual hours worked, but the increases in productivity have not been demonstrably different from the rates calculated in accordance with the equations. If full data were available, in particular about changes in the number of part-time workers—which may have been important in some countries—the relative productivity gains might be affected. It has however generally been found that reductions in annual hours worked do not have a proportional effect on annual productivity; there is some compensation from increases in productivity per worker-hour. Hence it could not be expected that a reduction by 1 per cent in annual hours worked would reduce growth of annual output per worker by much more than, say, 0.5 per cent a year.

The common pattern in the relationships between the growth rates of output, productivity and employment has been shown by cross-country comparison of trends. It is impracticable to confirm the association with a statistical test based upon the experience over time of individual countries. The 14-year period from 1953 to 1967 is too short to permit elimination of the cyclical fluctuations in most countries, and the correlation between output growth and productivity gains during the course of short-period business cycles is well known but not relevant to the longer period movements with which we are here concerned.

However, some hints about the longer-period development in individual countries may be picked from chart 3.2, showing five-year moving averages of manufacturing output, productivity and employment in each of the industrial west European countries. It is fairly clear that Belgium, Norway and Sweden exhibit the pattern found in the cross-country analysis—a positive association between output growth and productivity gains which is not simply a reflection of cyclical movements. There are traces of the same association in Finland and the United Kingdom.

---

[26] These comments should be read in the light of the statistical uncertainty of the equations. It should be recalled that the standard error of equation (3.4), for output growth related to income per head, is about 0.7; the standard errors of the equations for productivity and employment (3.6 and 3.7) are about 0.6 when all countries are included but are reduced to 0.3 when Denmark and Canada are excluded (equations 3.6*a* and 3.7*a*).

On the other hand, in Austria and western Germany, it appears to have been possible to maintain stable rates of productivity increase notwithstanding the downward trend in the rate of output growth. Productivity growth has also been rather steady in Denmark in spite of movements in output growth which may not be wholly cyclical. Elsewhere, there has been no perceptible non-cyclical variation in rates of output growth or of productivity growth (France,[27] Italy).

Thus it cannot be asserted with confidence that changes over time in the longer-term trend of output growth in each individual country, of the order of magnitude of those experienced in 1953-1967, will necessarily be accompanied by changes in productivity and employment corresponding to the correlations. Other factors besides the growth rate are clearly involved, and may continue to influence the development of productivity and employment rather differently in different countries.

It is apparent that the data so far used afford no single explanation of deviations from the common growth pattern. A cursory attempt only has been made so far to look behind these data into other characteristics of national economic structures. Some simple comparisons can however be shown between the national divergences of productivity and employment growth just presented, and some indicators of manufacturing investment, the development of manufactured exports and labour supply. The data are presented in table 3.3.

For a measure of relative investment in manufacturing, we have computed the cumulated investment per employee in manufacturing over the whole period 1953-1967 (investment at current prices, US$ at 1963 exchange rates). There appears to be no correlation between manufacturing growth itself and this investment variable.[28] On the other hand, the deviations from the arithmetic mean of the cumulated investment per employee over the whole period do show some co-variation with the divergences in productivity growth. The correlation coefficient is 0.80; nearly two-thirds of the variations in the productivity deviations can be statistically explained by the variations in the investment deviations. (But it was necessary to exclude the overseas industrialized countries from the calculations, as well as the Netherlands for lack of comparable data.) Furthermore the standard error of estimate is very big. So the correlation cannot do much more than indicate the probability of some kind of general relationship between investment behaviour and the productivity deviations.

It might be expected that productivity differences would be reflected in the development of exports, either because high productivity growth would increase competitiveness, or because a strong foreign demand could create a productivity increase. The correlations between the productivity divergences, on the one hand, and the export elasticity (trend growth of manufactured exports against trend growth of manufacturing output), or the deviations from average export elasticity, on the other, are however weak. When added as a second explanatory variable to the correlation between productivity divergences and the deviations in investment behaviour, the export variable increases the explanatory value of the correlation so as to make the coefficient 0.85. Slightly more than 70 per cent of the variations would then be " explained ".

It might be expected that fast rates of increase in manufacturing employment would be associated with a high share of agricultural employment in the total labour force. Only with a very liberal interpretation of the figures can such a relationship be found. It seems clear that in western Germany, Denmark and Canada manufacturing employment has increased much more than the share of agriculture in total employment would warrant, and in Austria much less. Labour supply in western Germany has been governed by other factors for a long part of the period studied. And, as was suggested above, in Denmark and Canada agricultural efficiency may have contributed to a relatively easy labour supply for manufacturing industry. But the relationships between the share of agriculture in the economy and the general process of economic growth are no doubt more complex than these simple comparisons can reveal.

(iii) Illustrative projections to 1980 of manufacturing growth

The set of cross-country equations described above may be used for projection into the future of the growth of manufacturing output by relating it to current levels of income per head.

It has been made clear that the degree of conformity with the international pattern of relationships between incomes per head and growth rates is not very close. The reasons for the national deviations lie partly in the special and transient circumstances of the period of observation, but partly, also, in certain persisting features of each country's economic structure and institutions and in the economic behaviour patterns of its citizens.

To the extent that the national deviations are due to transient causes, they will doubtless be replaced in future by other deviations, of which the pattern is unforeseeable; such deviations can only be regarded as margins of uncertainty surrounding any projection. To the extent that they are persisting, they should be incorporated in projections. If the persistent deviations could be convincingly distinguished from the transient ones,

---

[27] Apart from the temporary acceleration in employment growth in the early 1960s associated with the immigration from north Africa.

[28] The cross-country correlations between manufacturing output growth and the ratio of investment to output in manufacturing also proved weak.

TABLE 3.3

Some factors related to productivity and employment growth in manufacturing

Country	*Deviation in manufacturing productivity* [a]	*Cumulated manufacturing investment per person employed 1953-1967* [b]		*Elasticity of manufactured exports to manufacturing output* [d]	*Elasticity deviations from average* [e]	*Deviation in employment in manufacturing* [f]	*Share of employment in agriculture* [g]	
		Total $	*Deviation from average* [c] $				*Total*	*Deviations from average* [h]
Austria	−0.6	5 070	−2 471	1.7	−0.2	−1.1	31.8	+9.2
Belgium	+0.3	7 678	+137	2.3	0.4	−0.5	9.3	−13.3
Denmark	−1.1	3 853	−3 688	1.8	−0.1	+1.1	25.4	+2.7
Finland	−0.4	8 908	+1 367	1.4	−0.5	+0.3	36.6	+14.0
France	+0.5	9 378	+1 837	1.8	−0.1	−0.5	25.9	+3.3
Western Germany	+0.4	8 536	+995	2.1	0.2	+0.5	18.9	−3.7
Italy	+0.2	7 533	−8	2.6	0.7	−0.3	35.6	+13.0
Netherlands	0.0	n.a.	n.a.	1.9	0	−0.3	13.7	−8.9
Norway	−0.1	9 710	+2 169	2.0	0.1	−0.5	26.3	+3.7
Sweden	+1.5	9 843	+2 302	2.0	0.1	−0.2	20.2	−2.4
United Kingdom	(−1.3)	4 900	−2 641	1.8	−0.1	(−0.7)	4.8	−17.8
Canada	−0.8	(13 928)	. .	. .		+1.1	18.3	−4.3
Japan	+0.2	(5 770)	. .	. .		+0.3	40.6	+18.0
United States	−0.1	(13 717)	. .	. .		−0.1	9.2	−13.4

[a] See text table on page 69.

[b] Investment at current prices, 1963 official exchange rates, United States dollars.

[c] Unweighted average for western Europe less the Netherlands ($7,541).

[d] Trend growth in exports (current values in dollars) of manufactured exports divided by trend growth in manufacturing output.

[e] Unweighted average for western Europe (1.9).

[f] See text table above.

[g] Number of persons employed in agriculture as a percentage of total employment in 1953/55.

[h] Unweighted average for all countries: 22.6 per cent.

many problems—not only of economic analysis but also of economic policy—might be solved. To attempt such a distinction is beyond our competence.

It would, then, be unrealistic to base a set of projections on the assumption of complete convergence towards a common international pattern. It would be equally unrealistic, and not very useful, simply to extrapolate each country's past experience. Yet there are elements of common sense and realism in both approaches. The pragmatic solution adopted here is to take as a central projection of manufacturing growth the arithmetic mean of the results given by the two approaches: (*a*) the projection yielded by applying the equations relating growth to present levels of income per head, and (*b*) the projection yielded by extrapolating each country's " current trend " of output. First, however, the concept of the " current trend " must be defined.

Identifying the current trend of manufacturing output

For the comparative analyses so far made, the past growth trend has been measured by the least square trend over the whole period 1953-1967. To the extent that trends have been changing during this period, this trend measurement is inappropriate for incorporation as the extrapolatory element in the projections. As already observed, the substantial short-period fluctuations during 1953-1967 make it impossible to find a satisfying method of measuring the underlying trend of output during the more recent period—say the 1960s. But some attempt has been made to discover in which countries there is a clear indication of acceleration or deceleration in the growth rate of output, and to find for such countries an alternative measure of the " current trend "; any such measure must necessarily be rough, but should be more relevant for extrapolation than that yielded by the least squares trend over the whole period 1953-1967.

Some alternative measures of manufacturing output growth are set out in table 3.4 for western countries, showing the least square trend, a " receding weight average " (giving more weight to growth in more recent years) and the arithmetic average of percentage growth rates during the last seven, six and five years of the period 1953-1967. Chart 3.3 shows the annual changes in output in each country and a five-year moving average, compared with the least squares trend.

The chart may well suggest minor changes in trend during the course of the period in a number of countries. But the effect on the projections of taking a different figure from the least squares trend over the whole period would in most cases be small; and, in any case, the alternative, more up-to-date, measures could be substantially affected by adding another year or two to the data. Hence to justify a different figure from the least squares trend, the criterion applied is that the difference between the least squares trend and each of the averages for the latest five, six or seven years should be at least 0.5 per cent a year. For countries satisfying this criterion, the average nearest in value to the least squares

TABLE 3.4

Trends in manufacturing output (per cent a year)

Country	*Growth in manufacturing output* *Least squares trend*	*Receding weight average* [a]	*Average of last* *7 years*	*6 years*	*5 years*
	1953-1967				
Austria	6.0	5.8	4.2	4.2	*4.5*
Belgium	5.3	5.3	6.0	6.1	5.6
Denmark	5.6	5.3	5.3	5.4	4.8
Finland	6.0	5.9	5.6	5.0	4.9
France	5.5	5.4	5.3	5.3	5.2
Western Germany	6.8	6.1	*4.6* [b]	4.2	4.0
Italy	8.0	7.9	7.5	7.2	6.3
Netherlands	5.9 [c]	6.3	5.9	6.2	6.4
Norway	4.8	5.1	*5.3*	5.8	5.9
Sweden	6.0	5.7	6.6	6.3	5.8
United Kingdom	3.2	3.2	2.6	3.0	3.5
Ireland	5.0	5.2	6.4	6.0	*5.8*
Switzerland	n.a.	n.a.	4.4	*4.3*	4.1
Canada	5.0	5.1	*6.4*	6.9	6.6
Japan	14.3	14.3	13.5	12.5	13.3
United States	3.8	4.2	*5.7*	6.7	6.0
Greece	8.0	8.0	7.9	8.1	8.6
Portugal	8.2	8.6	8.6	8.9	9.4
Spain	8.7	8.8	10.8	10.1	*10.1*
Yugoslavia	11.7	10.7	9.1	9.5	*10.0*

NOTE. — Italicized figures in the last three columns represent the "current trend" used as an element in the projections where a different figure is adopted from the Least Squares Trend.

[a] Weighted mean of annual growth rates, the first year's change (1953-1954) being weighted by 1.0, the second year's by 1.1. etc.

[b] In projections, adjusted to 5.5 (see text).

[c] See table 3.1, footnote *e*.

trend has been taken (with some exceptions noted below) as the best available measure of the current trend.

This procedure yields the following cases in which the current trend appears substantially different from the least squares trend:

	Acceleration *Least squares trend*	*Current trend*		*Deceleration* *Least squares trend*	*Current trend*
Norway	4.8	5.3 (1960-1967)	Austria	6.0	4.5 (1962-1967)
Ireland	5.0	5.8 (1962-1967)	Western Germany	6.8	4.6 (1960-1967) [a]
Spain	8.7	10.1 (1962-1967)	Yugoslavia	11.7	10.0 (1962-1967)
Canada	5.0	6.4 (1960-1967)	Japan	14.3	13.5 (1960-1967) [a]
United States	3.8	5.7 (1960-1967)			

[a] See comments in text below.

For western Germany and Japan, however, the evidence does not really justify this procedure. For western Germany, the averages for recent years have been much affected by the stagnation in 1966 and 1967, and some allowance should be made for the subsequent fast recovery.[29] It seems reasonable to take for western Germany a "current trend" below the least squares trend

---

[29] Manufacturing output grew by 12-14 per cent in 1968 and again in 1969.

CHART 3.3

Volume growth rate in manufacturing output 1953-1968 and projection

(Annual percentage changes)

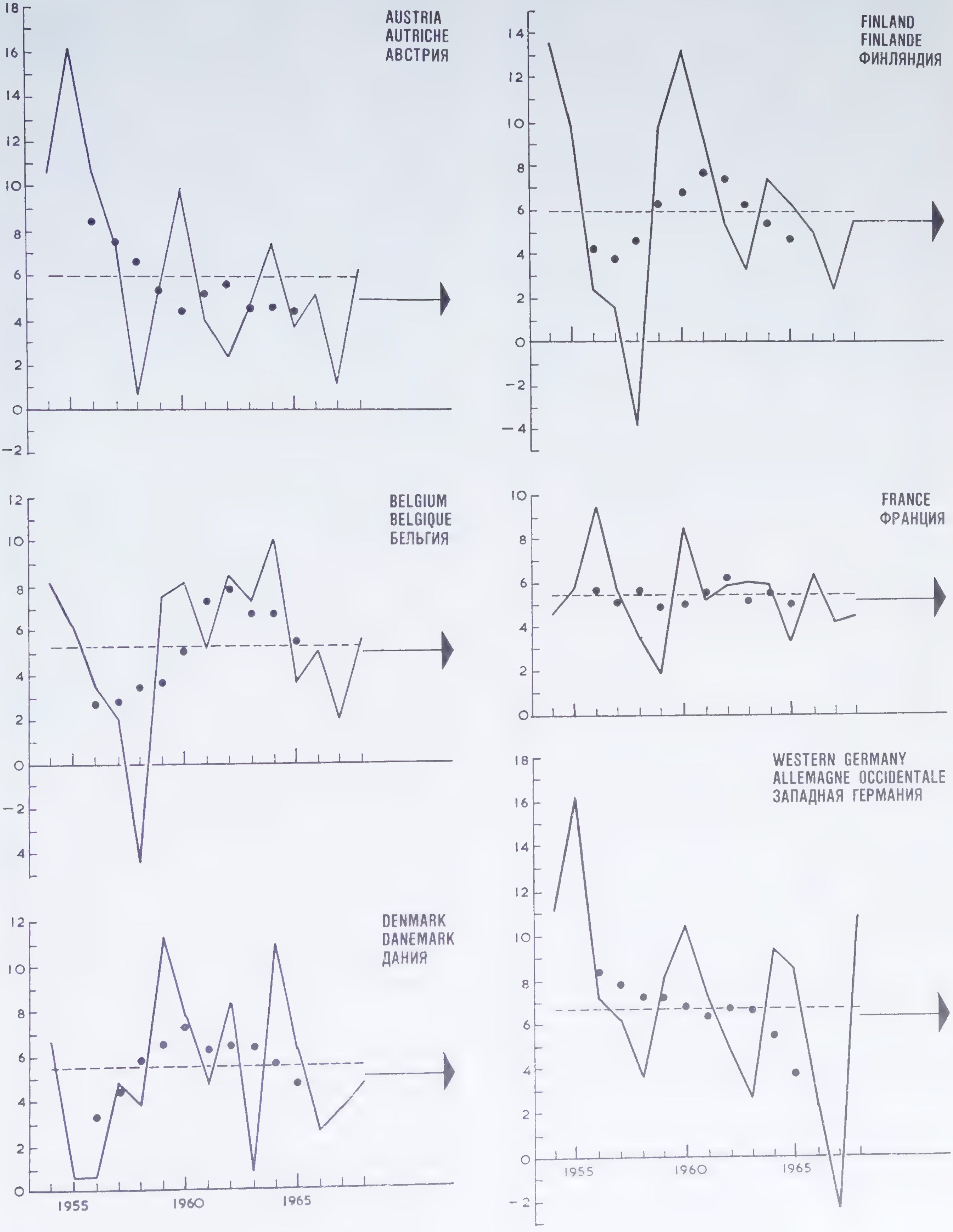


CHART 3.3 *(continued)*

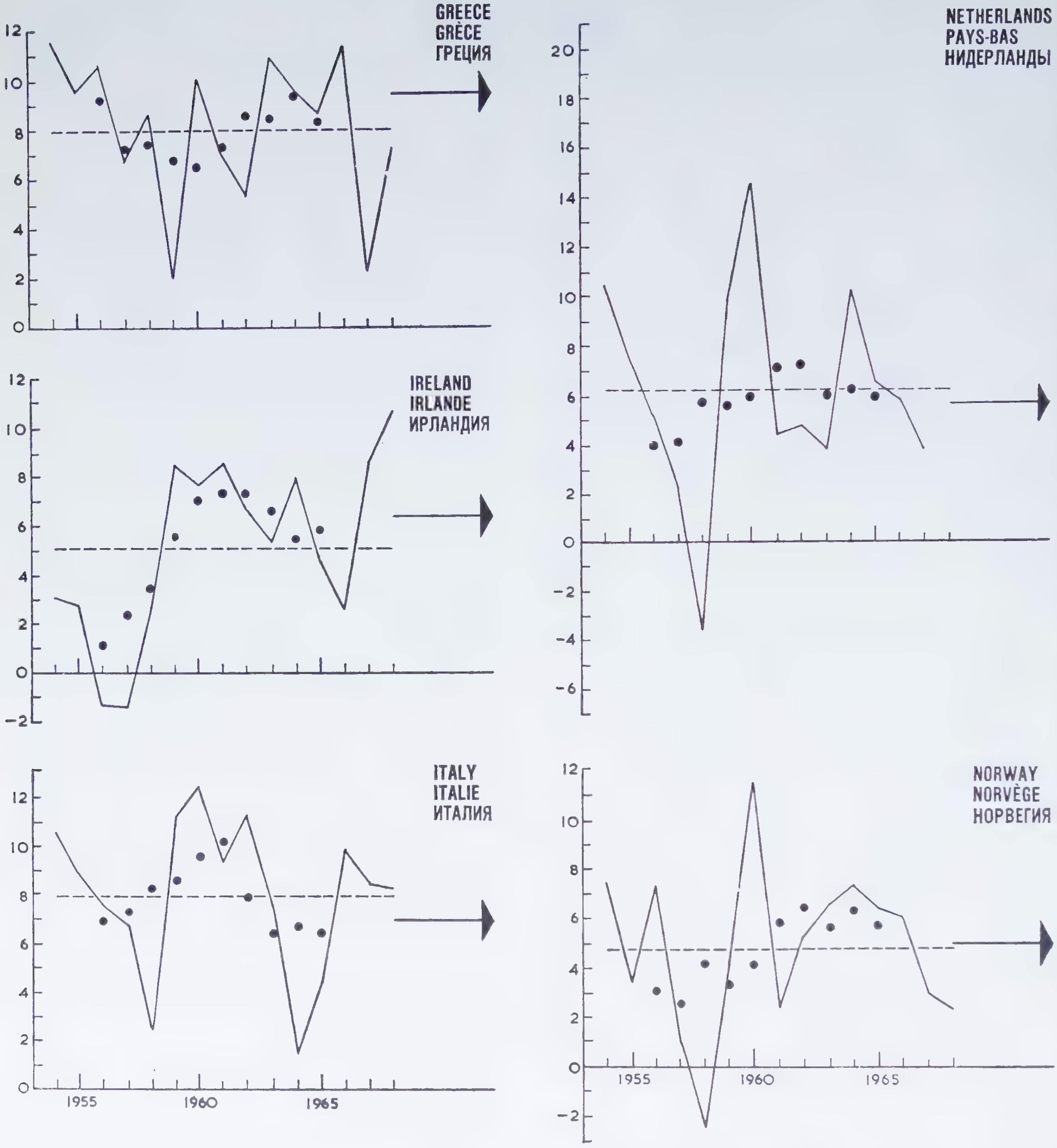
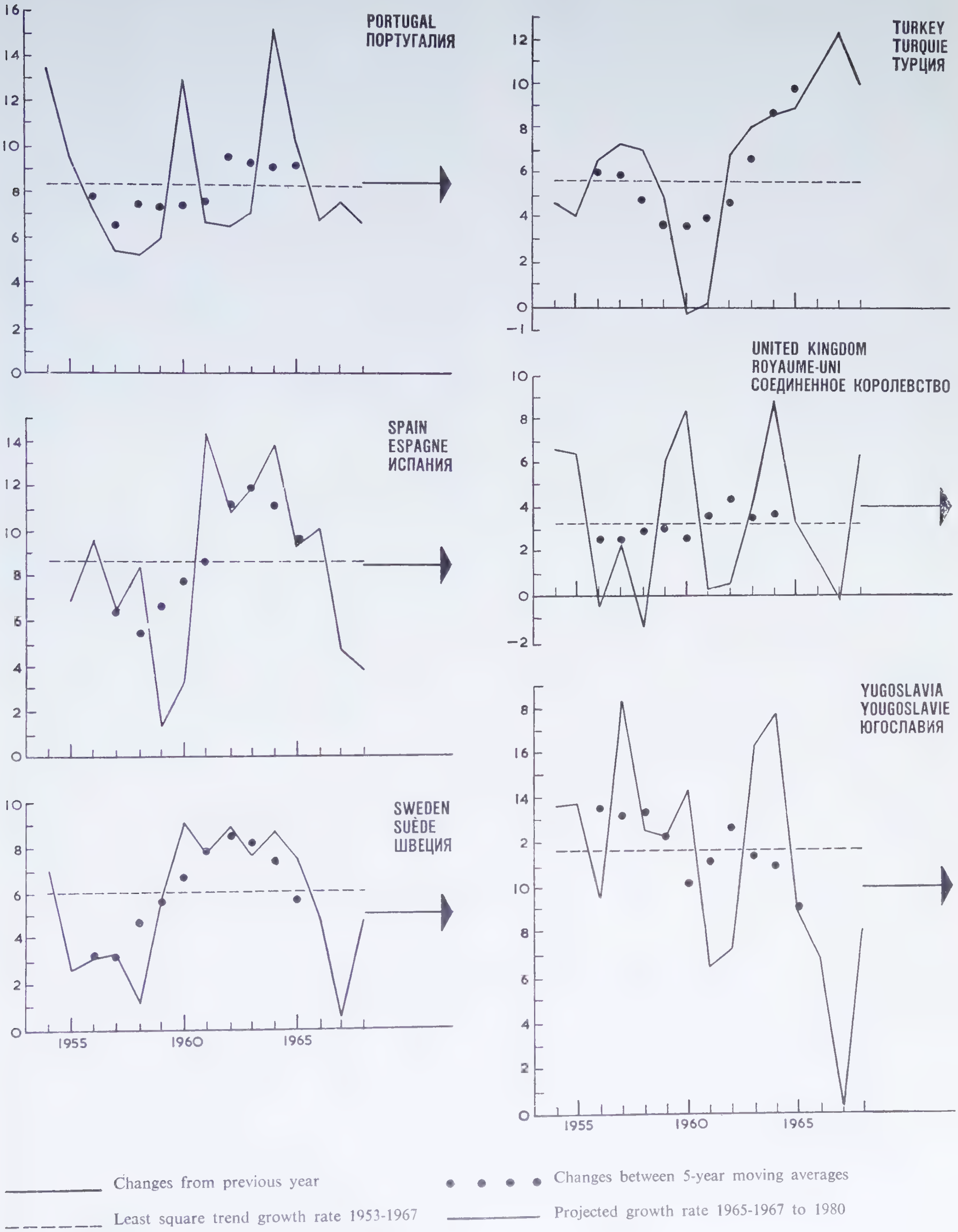


CHART 3.3 *(concluded)*



of 6.8 per cent a year, but the figure of 4.6 per cent yielded by the standard method described above appears unduly low. An arbitrary figure of 5.5 per cent has therefore been used. For Japan, the difference between the least squares trend and a more recent average cannot be regarded as significant.

Projections for manufacturing 1965-1967 to 1980

The bases for the projection of manufacturing output growth are set out in table 3.5. The first part of the table shows the alternative projections that would result from use of the five different equations described above (see table 3.1), representing different forms of the relationship between manufacturing output growth and the level of income per head. The relationship is applied to the level of income per head in each country in 1965-1967 (taking an average of the three years to eliminate short-period fluctuations).[30] The current trend, as just defined, is also shown.

It will be clear from the earlier discussion that this method of analysis appears generally appropriate for the industrial western countries, but less so for southern Europe. The differences between the projections yielded by equations (3.1) to (3.4)—all based on income per head at official exchange rates—result from the different shapes of the curves, due mainly to the different country coverage of the equations; in particular, the inclusion of southern Europe and of eastern Europe in equations (3.1), and of southern Europe in (3.1) and (3.2), have a considerable effect on the shape of the curve at the extreme income levels. Thus equation (3.1) yields an absurdly low value for the United States and a very low one for Sweden.

Equation (3.5), it will be recalled, is based on " adjusted " income levels; it yields considerably lower projections for every industrial country. As chart 3.1 shows, the " adjusted " incomes give not only a narrower dispersion of incomes but also suggest a steeper decline in the curve, particularly in the income range ($1,500-2,000 per head in 1965) where most of the industrial countries are found. It is to be expected that any adjustment

---

[30] For equation (3.5), based on " adjusted GDP ", estimates are made only for 1965.

TABLE 3.5

Projections of manufacturing growth rates, 1965-1967 to 1980

Country	GDP per head: At exchange rate (1965-1967) [a] US $	GDP per head: Adjusted (1965) [b] US $	Projected growth rate of manufacturing 1965-1967 to 1980 according to equations [c]: (3.1)	(3.2)	(3.3)	(3.4)	(3.5)	Past trend of manufacturing output: Trend 1953-1957	Past trend of manufacturing output: Current trend [d]	Projection adopted [e] 1965-1967 to 1980
Austria	1 070	1 459	5.7	5.4	5.5	5.5	4.4	6.0	4.5	5.0
Belgium	1 477	1 886	4.6	5.0	5.0	4.8	3.8	5.3	5.3	5.2
Denmark	1 651	1 820	4.2	5.0	4.9	4.6	3.9	5.6	5.6	5.1
Finland	1 420	1 585	4.8	5.1	5.1	4.9	4.2	6.0	6.0	5.6
France	1 646	1 616	4.2	5.0	4.9	4.6	4.2	5.5	5.5	5.2
Western Germany	1 589	1 854	4.4	5.0	4.9	4.6	3.9	6.8	5.5	5.2
Italy	926	1 190	6.2	5.5	5.8	5.9	5.0	8.0	8.0	6.9
Netherlands	1 269	1 796	5.1	5.2	5.2	5.1	4.0	5.9 [f]	5.9	5.6
Norway	1 616	1 668	4.3	5.0	4.9	4.6	4.1	4.8	5.3	5.0
Sweden	2 165	2 171	3.3	4.8	4.7	4.2	3.7	6.0	6.0	5.1
United Kingdom	1 516	1 929	4.6	5.0	(5.0)	(4.7)	3.8	3.2	3.2	4.0
Ireland	743	1 239	7.0	5.8	(6.3)	(6.7)	4.9	5.0	5.8	6.3
Switzerland	2 023	1 863	(3.5)	(4.8)	(4.7	(4.3)	(3.9)	n.a.	4.3 [g]	4.3
Canada	2 140	2 218	3.3	4.8	4.7	4.2	3.6	5.0	6.4	5.3
Japan	705	1 293	7.2	(6.0)	6.5	6.9	4.7	14.3	14.3	10.6
United States	3 256	2 597	1.9	4.6	4.4	3.7	3.5	3.8	5.7	4.7
Greece	580	758	7.9	6.3	(7.2)	(7.8)	..	8.0	8.0	(7.9) [h]
Portugal	363	733	9.5	7.5	(10.2)	(10.8)	..	8.2	8.2	(9.5) [h]
Spain	583	939	7.8	6.3	(7.2)	(7.8)	..	8.7	10.1	(9.0) [h]
Yugoslavia	384	692	9.3	7.3	(9.7)	(10.3)	..	11.7	10.0	(10.2) [h]
Turkey	225	333	..	(9.5)	..	..	..	..	..	..

NOTE. — Brackets denote value for countries not included in the estimation of the equation.

[a] 1963 factor cost.

[b] 1965 market prices.

[c] For specification of the equations and country coverage see table 3.1.

[d] See table 3.4.

[e] Arithmetic means of equation (3.4) and current trend (discrepancies are due to rounding).

[f] See table 3.1, footnote *e*.

[g] Average of last 6 years.

[h] For south European countries, some of these projections have been modified in the present report (see section 4 of this chapter). The figures are given here to illustrate the effect of applying the same method as that used for other European market economies.

of monetary income levels towards a more realistic measure of relative purchasing powers should compress the range. But the particular shape of curve resulting from the experimental method of correction here employed is necessarily sensitive to the data and methods used and particularly to the rather critical values set on the countries at the extreme ends of the range. Hence limited significance should at present be attached to the lower projections yielded by equation (3.5).

For fixing a single projection from the series of equations it thus seems reasonable to concentrate upon equation (3.4), described as our " standard " equation and giving reasonably well-fitting results for western industrial countries in the historical analysis.[31] (The country coverage in this equation is relatively homogeneous; it is based on industrial western Europe, excluding the United Kingdom and Ireland, together with the United States, Canada and Japan.)

The projections resulting from equation (3.4) may next be compared with the " current trend ", with which it is averaged to make a single projection. The projection from the equation *exceeds* the current trend in only three industrial countries:

Austria (excess of 1.0): the difference is less than that between the 1953-1967 trend and the estimated value for that period derived from equation (3.4); the actual rate of growth, taking the current trend, has diminished during the period while the estimated rate of output growth has diminished even more with rising income.

United Kingdom (excess of 1.5):[32] the difference is considerably smaller than the deviation from the historical equation.

Ireland (excess of 0.9):[32] the difference is again much less than the deviation from the historical equation, because the considerable acceleration in the growth rate during the period has more than offset the rise in income per head.

In all the other industrial countries, equation (3.4) yields lower projected growth rates than the current trend. This is mainly because the fall in growth rates associated by the equation with rising income levels has not yet, in most countries, been reflected in a general slowing down of growth rates during the course of the period examined. As already pointed out, it is impossible in most countries to identify any such change in trend among the short-period fluctuations. This is another reason for not basing a projection wholly on the equation. The lower projections yielded by the standard equation, as compared with the current trend, are particularly marked, among industrial western European countries, in Italy and Sweden (differences of about 2 per cent a year) and in Denmark, Finland, France, western Germany and the Netherlands (differences in each case of about 1 per cent a year).

Outside Europe, the striking case is Japan, whose manufacturing growth rate remains very high in spite of the big increase in income per head (and would be so whatever reasonable measure of income per head is adopted, or however the current trend in output growth is measured). The implication of the equations, and of the averaging of the results of the equation with the current trend, is that the rate of growth in Japan will decline now that Japan is entering the range of incomes per head reached in industrial western Europe. No precise significance need however be attached to the exact projection of the future growth rate in Japanese manufacturing.

The projections adopted for manufacturing growth in the industrial western countries, resulting from the averaging of equation (3.4) with the current trend, are shown in the last column of table 3.5. The result is a series of projected growth rates which are less than the current trend in 12 of the 15 countries.[33] In seven countries, the decline in growth rates is only 0.1 to 0.5 per cent a year. In four, Italy, Sweden, Canada and the United States, the decline is about 1 per cent; for Japan the growth rate declines from over 14 per cent in the past to over 10 per cent in the projection.

By contrast, the implication of the projection method is an acceleration of growth rates in Austria (by 0.5 per cent) the United Kingdom (0.9 per cent) and Ireland (0.5 per cent).

For south European countries, as already suggested, the projection method cannot be regarded as particularly appropriate because the equations are so heavily weighted by countries with very different economic structures and growth patterns. A fuller discussion of prospects for the south European countries, taking fuller account of their special circumstances, is given on page 117 of this chapter. But some purpose may be served by applying the same projection method, and the results are shown in table 3.5. The projections proposed on page 120, for manufacturing output, are:

	Projections 1965-1967 to 1980		
	Proposed	*Estimated (equation 3.4)*	*Current trend*
Greece	9.5	7.8	8.0
Portugal	8.5	10.8	8.2
Spain	8.5	7.8	10.1
Yugoslavia	10	10.3	10.0

It would not be at all unreasonable to regard the projection method employed as indicating simply a range of alternative possibilities; use might be made of the standard errors of estimate attaching to the equations. For example, it might be suggested that any resulting projection of the growth rate, for industrial western countries, should be regarded (with 90 per cent probability) as subject to a range of at least ±0.75 per cent.[34] However for the subsequent projections of employment, productivity and output in the economy as a whole and its major sectors—each with its own margins of uncertainty—it is preferable to build on a single, if rather arbitrary, figure. It would otherwise be necessary to work through the whole system with a very big range of alternatives. It will appear from subsequent discussion that a direct estimate of GDP growth, incorporating the growth of other sectors in addition to manufacturing, should yield a substantially smaller margin of uncertainty than the sum of the margins for the individual sector estimates.

---

[31] It will be recalled that this equation was chosen instead of the slightly better-fitting equation (3.3), in order to simplify subsequent calculations. Table 3.5 shows that the projections yielded by the two equations differ only slightly.

[32] Note that these countries are not included in the calculation of equation (3.4).

[33] For Switzerland the comparison is not relevant.

[34] The standard error of estimate for equation (3.4).

We now pass on to consider the relationships between manufacturing growth and the growth of other sectors of the economy.

3.3 GROWTH PATTERNS OUTSIDE THE MANUFACTURING SECTOR

(i) Over-all relationships: manufacturing, non-manufacturing and GDP

In the previous section, the theme was developed of manufacturing as the motor of the whole economy. This theme implies links between growth in manufacturing and growth in the non-manufacturing sectors—and thus between growth in manufacturing and the development of the gross domestic product. The present section is intended to show to what extent we can find a common inter-country pattern to describe quantitatively the form and nature of these links.

The inverse relationship between manufacturing growth rates and the levels of income per head has also been explored in the previous section. It must now be shown how far non-manufacturing growth rates are correlated with income levels. We could thus envisage a triangular relationship:

$$\begin{tikzcd} & \text{Income per head} \arrow[dl] \arrow[dr] & \\ \text{Manufacturing growth} \arrow[rr] & & \text{Non-manufacturing growth} \end{tikzcd}$$

A more formalized description of the equations representing these relationships will be found in appendix 3.I. That there must be common elements in the pattern of relationship between manufacturing and non-manufacturing growth is evident from the familiar uniformity in the pattern of change in demand. But it is equally clear that any pattern will be broken by differences in the level and development of foreign trade and by a variety of special factors influencing the growth of particular sectors. The aggregative approach to the non-manufacturing part of the economy will therefore be followed by closer analysis of its individual components.

In every country, the actual rates of growth in non-manufacturing as a whole, and therefore in GDP, have been slower than in manufacturing (see table 3.6). This slower growth rate can be described by an elasticity which is simply the ratio of one growth rate to the other (taking least squares trends over the period 1953-1967). The elasticities vary quite substantially. In most of the south European countries, in Italy and in Japan, the growth rates of non-manufacturing are only 50-60 per cent of the growth rates of manufacturing. But in nearly all the other western countries, non-manufacturing has grown by 70-80 per cent of the growth rate of manufacturing—in the United States by 95 per cent. A crude connexion at once emerges; in the poorer countries, the lead is taken by manufacturing industry far more conspicuously than in the richer. In itself, this might seem obvious enough, since the manufacturing base is so small in the poorer countries. In fact, however, the difference in the weights of manufacturing between rich and poor is not so great; even in 1954, the manufacturing share of GDP [35] was 20-25 per cent in the south European countries (except Greece—only 12 per cent) and in Japan and Italy and rose only to about one-third of GDP in the countries where it was highest. Moreover, two of the richer countries—Belgium and Sweden—are clear exceptions; there, the ratios of non-manufacturing to manufacturing growth are as low as 55-60 per cent, within the range of the poorer countries. And among the poorer countries, Greece and Ireland stand out with rather high ratios (65-70 per cent).

The same pattern naturally applies (with the same exceptions) to the relationship of GDP to manufacturing growth. GDP growth has been only 60-70 per cent of manufacturing growth in most of the poorer countries, but 80 to 90 per cent in most of the richer—rising to 96 per cent in the United States.

How far can these rough associations be expressed in quantitative form as a guide to an international pattern of development ?

As already shown, a precise relationship between manufacturing growth and the level of GDP per head does not exist when the industrial west European countries and the southern countries are taken together. Thus the main equations in the following discussion are based on data only for the industrial countries.

Growth of GDP in relation to manufacturing growth

We begin by estimating the cross-country relationship between GDP growth and manufacturing growth. A linear equation for the industrial countries (excluding Ireland) gives the following result:[36]

$$\text{Growth rate of GDP} = 1.12 + 0.6002 \text{ mfg growth rate} \qquad (3.8)$$
$$(r = 0.97;\ \sigma = 0.38)$$

---

[35] Contribution of manufacturing to GDP in 1953 at 1963 prices.

[36] Comparison may be made with a similar cross-country equation, calculated from data for a slightly different group of countries and span of years, in the study by Kaldor already quoted (Kaldor, *op. cit.*, p.5). That equation showed:

Growth rate of GDP = 1.15 + 0.61 manufacturing growth rate (r = 0.98; σ = 0.40).

TABLE 3.6

Growth rates and elasticities to manufacturing: GDP and non-manufacturing, 1953-1967

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Growth rates (least squares trends)			*Elasticities observed to manufacturing*		*Elasticities estimated from cross-country equations*		*Residuals* [c]	
Country	*GDP*	*Manu-facturing*	*Non-manu-facturing*	*GDP*	*Non-manu-facturing*	*GDP* [a]	*Non-manu-facturing* [b]	*GDP*	*Non-manu-facturing*
Austria	5.1	6.0	4.7	0.86	0.78	0.79	0.71	0.07	0.07
Belgium	3.7	5.3	3.1	0.71	0.59	0.83	0.75	−0.12	−0.16
Denmark	4.4	5.6	3.9	0.79	0.71	0.81	0.73	−0.02	−0.03
Finland	4.8	5.9	4.4	0.80	0.73	0.79	0.71	0	0.02
France	4.9	5.5	4.6	0.89	0.84	0.82	0.74	0.08	0.10
Western Germany	5.5	6.8	4.8	0.81	0.71	0.76	0.67	0.05	0.04
Ireland	2.5	5.1	1.7	0.49	0.34	(0.84)	(0.76)	(−0.35)	(−0.42)
Italy	5.3	7.9	4.3	0.67	0.55	0.73	0.63	−0.07	−0.08
Netherlands	4.8	5.9	4.3	0.80	0.72	0.80	0.71	0.01	0.01
Norway	4.1	4.8	3.8	0.85	0.79	0.85	0.79	0	0
Sweden	4.2	6.0	3.4	0.69	0.55	0.79	0.71	−0.10	−0.15
United Kingdom	2.8	3.2	2.5	0.86	0.79	(1.01)	(0.99)	(−0.15)	−0.20
Greece	5.8	8.0	5.4	0.73	0.68	(0.73)	(0.62)	(0)	(0.06)
Portugal	5.1	8.2	3.9	0.62	0.47	(0.73)	(0.61)	(−0.11)	(−0.14)
Spain	5.9	8.7	4.9	0.68	0.57	(0.72)	(0.80)	(−0.04)	(−0.23)
Yugoslavia	8.3 [d]	11.7	6.8 [d]	0.61	0.58	(0.68)	(0.54)	(0.03)	(0.04)
Canada	4.4	5.0	4.2	0.88	0.84	0.84	0.77	0.04	0.07
Japan	9.8	14.3	8.3	0.69	0.58	0.65	0.51	0.04	0.07
United States	3.6	3.8	3.6	0.96	0.94	0.94	0.90	0.02	0.04

NOTE. — Parentheses denote value for countries not included in the estimation of the equation. Elasticities and residuals calculated from figures with greater number of decimals than in preceding columns.

[a] From equation 3.9.

[b] From equation 3.11.

[c] Observed minus estimated elasticities.

[d] Gross material product.

The elasticity of GDP growth on manufacturing growth implied by this equation is, therefore:

$$\frac{\text{Growth rate GDP}}{\text{Growth rate mfg}} = \frac{1.12}{\text{Growth rate mfg}} + 0.60$$

The elasticities resulting from this expression are confirmed[37] by a direct estimate of elasticities based on the actual values shown in table 3.6:

$$\frac{\text{Growth rate GDP}}{\text{Growth rate mfg}} = \frac{1.4758}{\text{Growth rate mfg}} + 0.55 \qquad (3.9)$$

$$(r = 0.74;\ \sigma = 0.06)$$

In what follows, the elasticities used are those given by equation (3.9); they are set out in table 3.6 column 6. The elasticities are shown to fall as the rate of growth increases,[38] being close to 1.0 at low growth rates of manufacturing (as in the United Kingdom or United States) and tending towards a limiting value of 0.6 at high growth rates (0.6 to 0.7 in Italy and Japan). For nearly all the industrial countries, the calculated values are between 0.75 and 0.85. This can be linked with our previous conclusion that growth rates of manufacturing tend to rise as the level of income per head falls. The implication—to be developed more fully below—is that the elasticity of GDP against manufacturing increases with rising income. This is in accordance with the observations made by other authors, notably Chenery, covering a much wider range of countries.[39]

As table 3.6 shows, the calculated elasticity values are generally close to the actual values observed. The comparison brings out at once, however, certain divergences from the international " norm ". Austria and France both show rather high elasticities—denoting exceptionally high rates of GDP growth in relation to manufacturing growth; Belgium, Sweden and the United Kingdom show low elasticities—their growth rates of GDP were low in relation to their manufacturing growth. Some of the reasons underlying these national divergences will be examined below.

---

[37] The direct estimates of elasticity from equation (3.9) differ from the estimates implied by equation (3.8) by not more than 0.05 in any country. 5 per cent manufacturing growth means a GDP growth of 4.12 according to equation (3.8) but 4.23 according to equation (3.9).

[38] The concave form of the curve of elasticities as the manufacturing growth rate rises necessarily follows because it derives from the linear equation (3.8) chosen for the relationship between the growth rates of manufacturing and GDP.

[39] H.B. Chenery, " Inter-country and inter-temporal patterns of industrial growth " in *Sectoral aspects of projections for the world economy* (Seminar on long-term economic projections, Denmark) United Nations 1969.

It is, of course, true that the growth rates of manufacturing and GDP are auto-correlated, since manufacturing alone represents about one-third of GDP. We therefore proceed to examine the elasticities of the non-manufacturing sectors as a whole in relation to manufacturing growth.

Non-manufacturing growth in relation to manufacturing

Again, a linear equation gives the following result:

$$\text{Non-mfg growth rate} = 1.40 + 0.4692 \text{ mfg growth rate} \qquad (3.10)$$
$$(r = 0.93;\ \sigma = 0.52)$$

The fit is not so good as that showing the relationship between GDP growth and manufacturing growth (as in equation 3.8). This is to be expected, since in some countries but by no means in all, as will be shown, exceptional growth in manufacturing appears to be compensated by a reverse divergence in other sectors.[40]

Again, the elasticity of non-manufacturing can be derived from this equation as:

$$\frac{\text{Non-manufacturing growth}}{\text{Manufacturing growth}} = \frac{1.40}{\text{Manufacturing growth}}$$

And a direct estimate of elasticity from the actual data gives:

$$\frac{\text{Non-mfg growth}}{\text{Mfg growth}} = \frac{2.00}{\text{Mfg growth}} + 0.37 \qquad (3.11)$$
$$(r = 0.73;\ \sigma = 0.09)$$

Again, the differences between the derived and the direct estimates of elasticity are very small, the differences in the first parameter being generally offset by those in the second.[41] The direct estimate (3.11) is used in what follows.

The pattern of national divergences is, of course, much the same as that in the elasticities of GDP to manufacturing.

Elasticities of non-manufacturing growth to manufacturing using the same form:

$$a + \frac{b}{\text{manufacturing growth}}$$

have also been calculated for each country separately over time, using five-year moving averages to eliminate so far as possible the cyclical influences.[42] These are shown in table 3.7 and are compared with the elasticity given by the ratios of the least square trends for the whole period 1953-1967. It will be seen that there are hardly any differences. Moreover, the fit of the separate national elasticity curves over time is good for most countries. This confirms the stability of the relationship between manufacturing and non-manufacturing growth trends during the period. The values of the parameters do, however, differ between countries. Thus the time-series equations for Sweden:

$$\text{elasticity} = -0.01 + \frac{3.4031}{\text{mfg growth}}$$

suggest that the elasticity is wholly dependent on the manufacturing growth rate; whereas that for Norway:

$$\text{elasticity} = 0.73 + \frac{0.3}{\text{mfg growth}}$$

indicates an almost constant elasticity whatever the rate of manufacturing growth.

For three countries, the correlation in these national equations is non-significant. In Denmark and the United Kingdom, the high a and low b parameters suggest that the elasticities form a straight line, independently of the manufacturing growth rate; in France, the low a and high b parameters, together with the lack of correlation over time, suggest a very unstable relationship between manufacturing and non-manufacturing growth.

Growth of GDP and of non-manufacturing sectors in relation to GDP per head

We can now relate growth of GDP in 1953-1967, and the growth of non-manufacturing, directly to the level of GDP head in 1953-1955 by a cross-country regression.

For GDP growth, the best estimate obtained is:

$$\text{GDP growth rate} = 2.85 + \frac{1723.7705}{\text{GDP per head}} \qquad (3.12)$$
$$(r = 0.95;\ \sigma = 0.52)$$

(GDP measured in $US at official exchange rates)

For non-manufacturing growth, we get:

$$\text{Non-mfg growth rate} = 2.75 + \frac{1354.9656}{\text{GDP per head}} \qquad (3.13)$$
$$(r = 0.91;\ \sigma = 0.56)$$

(GDP measured in $US at official exchange rates)

The results of both equations are shown in table 3.8. Both are derived from data for the industrial west European countries, excluding the United Kingdom and Ireland for which the values (as for manufacturing growth) are too far removed from the regression line for the rest. The equation for the other countries has, however, been applied to the United Kingdom and Ireland in the table, but for Ireland, in particular, it is clear that the international equations are inappropriate.

National differences between the actual growth rates of GDP, and the international pattern relating GDP

---

[40] By eliminating countries with the biggest divergences of actual from calculated growth of non-manufacturing (Belgium, Italy, Sweden and United Kingdom) the standard error of estimate is reduced to 0.31, but the correlation coefficient is reduced to 0.66.

[41] Only the United Kingdom, Japan and the United States show a difference of more than 0.03 in the elasticities.

[42] It is known that short period fluctuations in manufacturing are generally much more marked than in non-manufacturing.

TABLE 3.7

Elasticity of growth of non-manufacturing sectors on manufacturing growth 1953-1967

(Computed on 5-year moving averages for each country with formula:

$$elasticity = a + \frac{b}{manufacturing\ growth})$$

Country	Value of coefficients				Estimated elasticity at trend growth in manufacturing	For comparison: Observed elasticity at trend growth in manufacturing [a]
	a	b	r	σ		
Austria	0.38	2.4192	0.84	0.07	0.78	0.78
Belgium	0.45	0.7343	0.72	0.07	0.59	0.59
Denmark	0.67	0.1815	0.17	0.06	0.70	0.71
Finland	0.39	2.0783	0.71	0.10	0.74	0.73
France	0.40	2.4432	0.37	0.09	0.81	0.84
Western Germany	0.47	1.6175	0.92	0.03	0.73	0.71
Ireland	0.58	−1.3319	0.85	0.09	0.32	0.34
Italy	0.25	2.4580	0.75	0.05	0.56	0.55
Netherlands	0.41	1.8953	0.53	0.12	0.73	0.72
Norway	0.73	0.2969	0.49	0.05	0.79	0.79
Sweden	−0.01	3.4031	0.98	0.05	0.55	0.55
United Kingdom	0.77	0.0790	0.06	0.09	0.79	0.79
Canada	0.46	1.8845	0.71	0.19	0.84	0.84
Japan	0.26	4.7213	0.76	0.06	0.59	0.58
United States	0.30	2.3739	1.00 *	0.05	0.93	0.94
Compare with following " international " coefficients:						
(3.11) All countries above excluding UK and Ireland	0.37	2.0019	0.73	0.09		
All countries excluding United Kingdom, Ireland, Japan	0.27	2.5635	0.73	0.09		
Excluding Belgium, Sweden, United Kingdom, Ireland, Japan	0.31	2.5104	0.89	0.05		

* Estimated value 0.998.

[a] From table 3.6 column 5.

growth rates to the level of income per head, may be accounted for by one or more of the following factors:

A divergence in manufacturing growth rates from the international pattern;[43]

A divergence in the elasticity of non-manufacturing to manufacturing growth from the international pattern of elasticities discussed above;

A divergence in the relative proportion or weight of manufacturing in the economy.

The relative importance of these three factors as influences on the growth of GDP is shown in table 3.9. The table runs as follows, taking Austria as an example. Austria's GDP growth rate in 1953-1967 was 5.1 per cent a year (column 1). On the international pattern relating growth rates of GDP to income per head (equation 3.12), the growth rate should have been 5.7. On the other hand, the international pattern of GDP growth to manufacturing growth (equation 3.8), when applied to Austria's actual manufacturing growth of 6.0, gives only 4.7 (column 3). Therefore the " deficiency " in the manufacturing growth rate would account for a " deficiency " in GDP growth rate of 1.0 (column 4) if Austria followed the international pattern with respect to elasticities and weights. However the observed " deficiency " in the GDP growth rate was only 0.6 (column 4). Therefore " excess " growth in the non-manufacturing sectors partly compensated, to the extent of 0.4 (column 6), for the deficiency in manufacturing growth. Of this compensation, 0.1 (column 7) was due to the weight of non-manufacturing in the economy. But the main reason (0.3) was the relatively high elasticity of non-manufacturing growth to manufacturing (column 8).

Generally speaking, it is found that the weight factor plays a minor role,[44] and that the main factor responsible for divergences in non-manufacturing growth rates is the divergences in the elasticities against manufactur-

---

[43] See page 58 ff.

[44] Except in Japan, and to a less extent in Italy. But the results for these two countries at the extreme end of the income scale are necessarily uncertain, since the calculated value of growth depends very much on the particular form of equation adopted.

TABLE 3.8

Direct estimates of GDP-growth and of growth in non-manufacturing sectors 1953-1967

(Annual percentage changes in output volume)

	GDP growth rates					*Growth in non-manufacturing sectors*				
Country	*Observed*	*Estimated as a function of manufacturing growth* [a]	*Residual* [b]	*Estimated as a function of GDP/head* [c]	*Residual* [b]	*Observed*	*Estimated as a function of manufacturing growth* [d]	*Residual* [b]	*Estimated as a function of GDP/head* [e]	*Residual* [b]
Austria	5.1	4.7	+0.4	5.7	−0.6	4.7	4.2	+0.5	5.0	−0.3
Belgium	3.7	4.3	−0.5	4.5	−0.8	3.1	3.9	−0.8	4.1	−0.9
Denmark	4.4	4.5	−0.1	4.4	−0.0	3.9	4.0	−0.1	4.0	−0.1
Finland	4.8	4.7	+0.1	4.7	+0.0	4.4	4.2	+0.2	4.2	+0.1
France	4.9	4.4	+0.5	4.5	+0.4	4.6	4.0	+0.7	4.0	+0.6
Western Germany	5.5	5.2	+0.3	4.7	+0.9	4.8	4.6	+0.2	4.2	+0.6
Ireland	2.5	(4.2)	(−1.7)	(6.0)	(−3.5)	1.7	(3.8)	(−2.1)	(5.2)	(−3.5)
Italy	5.3	5.9	−0.6	6.0	−0.7	4.3	5.1	−0.8	5.2	−0.9
Netherlands	4.8	4.7	+0.1	4.9	−0.1	4.3	4.2	+0.1	4.4	−0.1
Norway	4.1	4.0	+0.1	4.4	−0.3	3.8	3.7	+0.2	4.0	−0.2
Sweden	4.2	4.7	−0.5	4.1	+0.1	3.4	4.2	−0.9	3.7	−0.3
United Kingdom	2.8	3.1	−0.3	(4.3)	(−1.5)	2.5	2.9	−0.4	(3.9)	(−1.4)
Canada	4.4	4.1	+0.3	3.9	+0.5	4.2	3.8	+0.5	3.6	+0.6
Japan	9.8	9.7	+0.1	9.4	+0.4	8.3	8.1	+0.2	7.9	+0.4
United States	3.6	3.4	+0.2	3.5	+0.1	3.6	3.2	+0.4	3.3	+0.3

[a] Equation (3.8). Growth GDP $= 1.12 + 0.6002$ manufacturing ($r = 0.97$, $\sigma = 0.38$).

[b] Observed — estimated value.

[c] Equation (3.12). GDP growth $= 2.85 + \dfrac{1723.7705}{\text{GDP/head (1953-1955)}}$ ($r = 0.95$, $\sigma = 0.52$).

[d] Equation (3.10). Non-manufacturing growth $= 1.40 + 0.4693$ manufacturing growth ($r = 0.93$, $\sigma = 0.52$).

[e] Equation (3.13). Non-manufacturing growth $= 2.75 + \dfrac{1354.9656}{\text{GDP/head (1953-1955)}}$ ($r = 0.91$, $\sigma = 0.56$).

ing from the international pattern. In most industrial countries, GDP growth is so closely related to manufacturing growth that divergences in the two growth rates from the international pattern based on the level of GDP per head are in the same direction. Yet some differences emerge in individual countries, indicating special factors at work in the non-manufacturing sectors.

It may be recalled that the countries whose manufacturing growth in relation to GDP per head has been exceptionally *fast* (marked positive residuals in equation 3.4) are western Germany and Sweden. In western Germany the " excess " growth in manufacturing is somewhat reinforced by excess growth in non-manufacturing sectors and therefore in GDP. In Sweden, by contrast, non-manufacturing growth has been slow in relation to the international pattern—sufficiently slow to compensate fully for the fast growth of manufacturing. Thus Sweden shows no divergence from the international pattern relating GDP growth to GDP per head. The main reason in Sweden appears to lie partly in the lack of expansion of agricultural output and partly in the slow recorded growth of output in the public services.[45]

The countries with exceptionally *slow* growth rates in manufacturing are Austria, Norway, the United Kingdom and Ireland. In all four, the effects on GDP growth have been significantly moderated, but not offset, by developments in the non-manufacturing sectors. In Norway, indeed, the divergence of GDP growth from the international pattern is reduced to only a marginal figure (residual of −0.3 per cent a year). In Austria, the rather slow growth of manufacturing is generally attributed to the concentration of resources on the development of basic industries in the 1950s. GDP growth was supported by relatively fast growth in trade and miscellaneous services, partly connected with the development of tourism. In Norway the main reason is the exceptionally fast growth of transport, mainly explained by the growth of shipping with its relatively weak link with domestic industrial expansion. In the United Kingdom and Ireland several sectors show slow growth rates in relation to GDP per head, but to a less extent than in manufacturing.

At the same time, it is worth noting that in Belgium and in Italy rather low growth rates in non-manufacturing have been the main factors behind significantly low growth rates of GDP as a whole in relation to income levels. In Belgium, relatively low growth rates appear in several sectors; in Italy the main reason is the slow recorded growth of the trade sector.

---

[45] It is suggested below (where the divergences from the international pattern are examined in more detail) that Swedish statisticians may be exceptionally conservative in their methods of measuring the " real output " of public services.

TABLE 3.9

Analysis of deviations between observed and estimated GDP-growth

(Columns 1-8: annual percentage changes in output volume 1953-1967)

	GDP - growth rates			*Difference between growth rates of GDP*						
		Growth estimated as a function of:		*Net effect of divergence in manufacturing growth (3-2)*	*Remaining difference*				*Compare: residual in manufacturing growth rates* [e]	*Weight of manufacturing sector 1954*
						of which due to weights and elasticity				
Country	*Observed growth* [a]	*GDP per head* [b]	*Manufacturing growth* [c]		*Total (2-1)*	*Total* [d] *(3-1)*	*Weights*	*Elasticity*		
Austria	5.1	5.7	4.7	−1.0	−0.6	+0.4	+0.1	+0.5	−1.6	32.3
Belgium	3.7	4.5	4.3	−0.2	−0.8	−0.5	+0.0	−0.6	−0.4	27.2
Denmark	4.4	4.4	4.5	+0.0	−0.0	−0.1	+0.0	−0.1	+0.1	27.2
Finland	4.8	4.7	4.7	−0.0	+0.0	+0.1	−0.1	+0.2	−0.0	23.8
France	4.9	4.5	4.4	−0.0	+0.4	+0.5	+0.0	+0.4	−0.0	28.7
Western Germany	5.5	4.7	5.2	+0.5	+0.9	+0.3	+0.1	+0.1	+0.9	34.2
Ireland [g]	2.5	(6.0)	(4.2)	(−1.8)	(−3.5)	(−1.7)	(−0.1)	(−1.7)	(−2.9)	20.4
Italy	5.3	6.0	5.9	−0.1	−0.7	−0.6	−0.3	−0.1	−0.1	23.0
Netherlands	4.8	4.9	4.7	−0.2	−0.1	+0.1	+0.0	+0.0	−0.3	27.9
Norway	4.1	4.4	4.0	−0.4	−0.3	+0.1	+0.0	−0.0	−0.6	25.0
Sweden	4.2	4.1	4.7	+0.7	+0.2	−0.5	+0.0	−0.7	+1.2	29.0
United Kingdom [g]	2.8	(4.3)	3.1	(−1.3)	(−1.5)	−0.3	+0.2	−0.6	(−2.1)	32.8
Canada	4.4	3.9	4.1	+0.2	+0.5	+0.3	+0.0	+0.3	+0.4	25.4
Japan	9.8	9.4	9.7	+0.3	+0.4	+0.1	−1.1	+2.0	+0.5	19.6
United States	3.6	3.5	3.4	−0.1	+0.1	+0.2	+0.1	−0.0	−0.2	27.8

NOTE. — The residuals are calculated from estimates with a greater number of decimals, which explains why parts sometimes do not add up to the total. However between column 6 and the sum of columns 7 and 8 there is a small unexplained residual, which includes the effect of basing the weights effect on weights at the beginning of the period.

[a] Least-squares trend growth rates.

[b] Equation (3.12). GDP-growth $= 2.85 + \frac{1723.7705}{\text{GDP/head (1953-1955)}}$ $(r = 0.95, \sigma = 0.52)$.

[c] Equation (3.8). GDP-growth $= 1.12 + 0.6002$ manufacturing growth $(r = 0.97, \sigma = 0.38)$.

[d] Equals column 5—column 4.

[e] From equation (3.4). Manufacturing growth $= 2.82 + \frac{2888.3074}{\text{GDP/head (1953-1955)}}$ $(r = 0.96, \sigma = 0.74)$.

As a percentage of total output (1963 factor cost) (1954 taken to represent average 1953/1955).

[g] Values within brackets indicate that the country is not included in the estimate of the equation.

The "elasticity" of non-manufacturing growth, on which emphasis has been placed, is of course a portmanteau expression covering a variety of factors. The quite reasonable fit of the equation for most countries justifies the description of it as an "elasticity"—implying that manufacturing growth is the main determinant of the growth of the non-manufacturing sectors. However it is clear that divergences from the international pattern do not represent only differences in strictly multiplier effects such as the dynamics of changing expenditure patterns or of foreign trade patterns. They may also indicate special factors influencing the growth of a particular sector, e.g. agricultural policy, in which case the term "elasticity" may well be inappropriate. Some of the specific reasons for differing elasticities are provided in the following sections, which consider individual sectors.

Meanwhile it may be convenient to sum up the effects of all the factors involved in the elasticities. These can be shown by the difference between the residuals in the standard equations for manufacturing growth and for GDP-growth.[46] These differences indicate the varying degrees to which GDP-growth suffers from a "deficient" manufacturing growth rate or, alternatively, to what extent their GDP-growth gains from an "excess" manufacturing growth.

Too much significance cannot be attributed to the table but the marked difference between the extremes should be noted. For Sweden, at one extreme, a manufacturing growth rate about 1 percentage point higher than that given by the international pattern would be needed to yield GDP-growth in accordance with the international pattern. For Austria at the other extreme, a manufacturing growth rate about 1 percentage point lower than that given by the international pattern would still allow GDP-growth in accordance with the international GDP-growth pattern.

---

[46] Equation 3.4 for manufacturing growth and equation 3.5 for GDP-growth.

	Residual in standard equation		*Difference between residuals*
	for mfg growth	*for GDP growth*	
Countries with elasticities unfavourable to GDP-growth			
Sweden	+1.2	+0.1	−1.1
Italy	−0.1	−0.7	−0.6
Belgium	−0.4	−0.8	−0.4
Countries with approximately same residual in both equations			
Denmark	0.1	0.0	−0.1
Japan	0.5	0.4	−0.1
Finland	0.0	0.0	0
Western Germany	0.9	0.9	0
Canada	0.4	0.5	+0.1
Netherlands	−0.3	−0.1	+0.2
Countries with elacticities favouring GDP-growth			
Norway	−0.6	−0.3	+0.3
United States	−0.2	0.1	+0.3
France	0.0	0.4	+0.4
United Kingdom	(−2.1)	(−1.5)	(+0.6)
Austria	−1.6	−0.6	+1.0

Productivity and employment in non-manufacturing as a whole

Section 3.3 (ii) discussed the development of productivity and employment in manufacturing compared with output growth. The results were used for an analysis of national differences in output growth, compared with the international pattern. The same kind of calculations has been made for the non-manufacturing sectors as a whole and for total GDP.

Table 3.10 gives the results of certain equations correlating employment and productivity growth with output growth.[47] These must be interpreted with caution (if there were no employment growth and the whole output growth was due to productivity increases, we would be correlating output growth with itself). Some of the results however seem to be of genuine interest. Chart 3.4 illustrates table 3.10.

The correlation coefficient for productivity on output growth is always very high. There is a marked difference, however, between the expression for the manufacturing sector and that for the non-manufacturing sectors: for manufacturing the constant is positive and around + 1 per cent; for non-manufacturing it is negative and varying between −0.1 and −0.4 per cent, depending whether total non-manufacturing, non-manufacturing less agriculture, or total GDP is considered. For total non-manufacturing, the slope of the curve is much steeper than the manufacturing curve: the former starts at a lower position but from output growth rates of about 4 per cent the productivity increase in non-manufacturing is bigger than in manufacturing. This, however, seems to be a reflexion of the development in agriculture (where the relationships between productivity, employment and output have special features); if agriculture is excluded, the productivity curve for non-manufacturing runs parallel with the curve for manufacturing and about one point below it. The productivity curve for total GDP however retains the properties of the curve for total non-manufacturing: it cuts the curve for manufacturing at about 4 per cent growth rate in output.

---

[47] It seems fair in this context to limit the discussion to the estimates for industrial countries excluding Canada (for manufacturing also excluding Denmark). The estimates for other countries are not greatly affected if Canada is included but its exclusion significantly improves the fit of the curves. Table 3.10 gives the estimates of the equations both with full and limited country coverage.

TABLE 3.10

Employment and productivity growth in manufacturing, non-manufacturing and total economy as a function of output growth: industrial western countries 1953-1967

$(y = a + bx)$

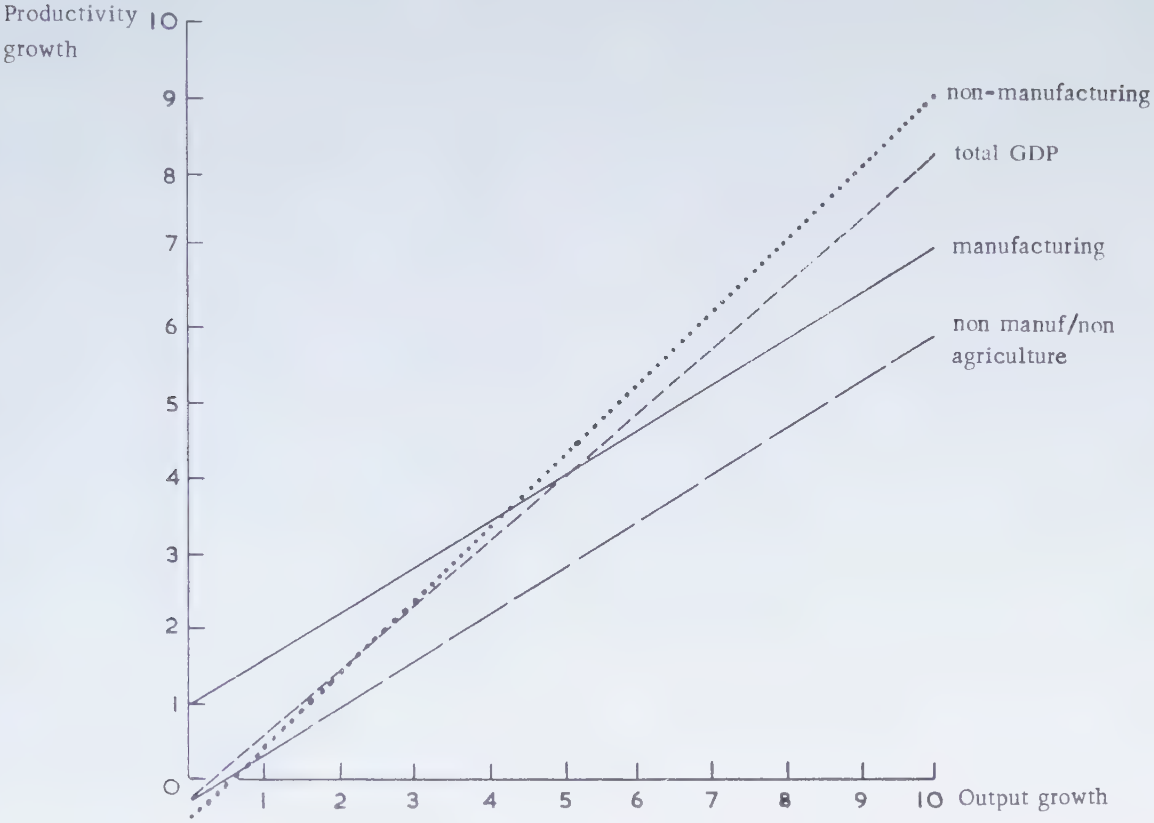
	All countries				*Limited country coverage* [a]			
	a	*b*	*r*	*σ*	*a*	*b*	*r*	*σ*
A. *Productivity (y) against output (x)*								
1. Manufacturing	0.67	+0.64	0.95	0.57	+1.01	+0.61	0.99	0.32
2. Non-manufacturing	−0.60	+0.97	0.89	0.66	−0.44	+0.97	0.95	0.44
3. Non-agricultural/non-manufacturing	−0.29	+0.62	0.87	0.60	−0.12	+0.61	0.95	0.36
4. GDP	−0.33	+0.87	0.93	0.58	−0.13	+0.85	0.97	0.38
B. *Employment (y) against output (x)*								
1. Manufacturing	−0.52	+0.33	0.85	0.56	−0.85	+0.35	0.96	0.31
2. Non-manufacturing	+0.67	+0.02	0.05	0.63	+0.51	+0.03	0.10	0.39
3. Non-agricultural/non-manufacturing	+0.26	+0.37	0.74	0.58	+0.10	+0.38	0.89	0.34
4. GDP	+0.38	+0.11	0.31	0.56	+0.17	+0.13	0.52	0.37

[a] Denmark and Canada omitted from equations for manufacturing; Canada omitted from non-manufacturing and GDP equations.

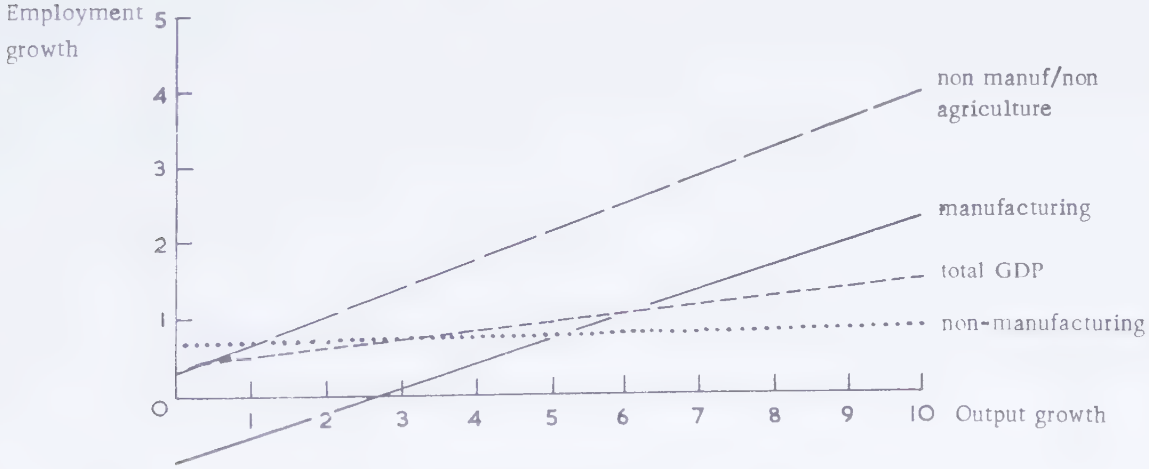
CHART 3.4

Productivity and employment estimated as a function of output

(Annual growth rates)



Manufact. productivity = 1.01 + 0.61 output growth (r = 0.99, σ = 0.32)
Non-manuf./non-agric. productivity = - 0.29 + 0.62 output growth (r = 0.87, σ = 0.60)
Non-manuf. productivity = - 0.60 + 0.97 output growth (r = 0.90, σ = 0.66)
Total economy productivity = - 0.33 + 0.87 output growth (r = 0.93, σ = 0.58)



Manufact.; employment = - 0.85 + 0.32 output growth (r = 0.96, σ = 0.31)
Non-manuf./non-agric. empl. = 0.27 + 0.37 output growth (r = 0.74, σ = 0.58)
Non-manuf. employment = 0.67 + 0.02 output growth (r = 0.05, σ = 0.63)
Total economy employment = 0.38 + 0.11 output growth (r = 0.31, σ = 0.56)

NOTE.— Derived from cross-country equations (industrial west). The UK included and Canada excluded from the estimates. For manufacturing also Denmark excluded.

These properties of the productivity output curves are of course fully reflected in the corresponding curves for employment growth against output growth. Chart 3.4 shows that, whereas the employment growth in total non-manufacturing is close to 0.5 per cent a year at any output growth rate, there is a steep increase when agriculture is excluded. Bearing in mind the risks of this procedure, it would be safer to attribute significance to the cases only where there is a high correlation coefficient for *both* productivity and employment.[48] This is the case in manufacturing, and in non-manufacturing less agriculture, but not when agriculture is included, or when total GDP is considered.

The main conclusion is then that there is (as for manufacturing) a strong correlation between growth rates in employment, productivity and output in the non-manufacturing sectors excluding agriculture. Broadly speaking, the regression coefficient is such that for each percentage point of output growth productivity increases by somewhat more than half a point, and employment by somewhat less than half a point—about the same as in the manufacturing sector. But the effect of the equations as a whole, when the constants are introduced, is that productivity growth for a given increase in non-manufacturing output is considerably less, and employment growth considerably greater, than for the same increase in manufacturing output. The comparatively good results of these correlations for manufacturing and for non-manufacturing excluding agriculture, and the uncertain result for total GDP, stress the importance of productivity and employment development in agriculture as a key factor in over-all development.

(ii) **Output and employment trends in individual non-manufacturing sectors** (other than agriculture and public services)

In this part of the study, we briefly examine relative output trends in the following non-manufacturing sectors: (*a*) mining, (*b*) electricity, gas and water (for brevity, described as " public utilities "), (*c*) construction, (*d*) transport and communications, (*e*) distribution (or trade), and (*f*) miscellaneous services. This leaves two important sectors for separate examination: agriculture, forestry and fishing (see pp. 97-111) and public services (see pp. 111-117). These sectors are treated separately because—although as will be seen, not unresponsive to general trends and levels in the economy—they may be regarded, to a greater extent than other non-manufacturing sectors, as reflecting exogenous elements in the process of structural change.

In each of the non-manufacturing sectors examined here, the method of approach is similar, so far as seems appropriate, to that already used in the analysis of trends in non-manufacturing as a whole. For each sector, we can ask whether a systematic pattern can be

Table 3.11

Employment and productivity as a function of output growth, 1953-1967

(Annual percentage growth rates)

	Productivity against output						*Employment against output*					
	Estimated values			*Residuals* [d]			*Estimated values*			*Residuals* [d]		
Country	*Non-manufacturing* [a]	*Non-manufacturing* [b] *non-agricultural*	*GDP* [c]	*Non-manufacturing*	*Non-manufacturing non-agricultural*	*GDP*	*Non-manufacturing* [e]	*Non-manufacturing* [f] *non-agricultural*	*Total GDP* [g]	*Non-manufacturing*	*Non-manufacturing non-agricultural*	*Total GDP*
Austria	3.9	3.0	4.1	0.6	0.0	0.6	0.8	2.3	0.9	−0.6	−0.1	−0.
Belgium	2.4	1.8	2.9	0.2	0.5	0.2	0.7	1.5	0.8	−0.3	−0.5	−0.
Denmark	3.2	2.6	3.5	0.1	0.0	−0.3	0.8	2.0	0.9	−0.2	−0.1	0.
Finland	3.6	3.0	3.8	−0.2	−0.7	−0.2	0.8	2.2	0.9	0.2	0.6	0.
France	3.9	2.8	3.9	0.6	0.6	0.7	0.8	2.1	0.9	−0.7	−0.5	−0.
Western Germany	4.1	2.9	4.5	−0.0	0.2	−0.2	0.8	2.1	1.0	−0.1	−0.1	0.
Italy	3.6	2.8	4.3	0.8	−0.0	0.6	(0.8)	2.1	1.0	−0.9	−0.0	−0.
Netherlands	3.6	2.6	3.8	−0.5	0.0	−0.3	0.8	2.0	0.9	0.4	−0.1	0.
Norway	3.1	2.6	3.2	0.5	0.6	0.5	0.7	2.0	0.8	−0.5	−0.5	−0.
Sweden	2.7	2.1	3.3	0.2	−0.2	0.2	0.7	1.7	0.8	−0.2	0.2	−0.
United Kingdom	1.9	1.3	2.1	0.1	0.4	0.1	0.7	1.2	0.7	−0.1	−0.4	−0.
Canada	3.5	2.6	3.5	−1.7	−1.6	−1.5	0.8	2.0	0.9	1.6	1.6	1.
Japan	7.5	5.8	8.2	−0.1	0.2	−0.1	0.8	3.8	1.5	−0.0	−0.2	0.
United States	2.9	2.0	2.8	−0.6	−0.1	−0.3	0.7	1.6	0.8	0.5	0.1	0.

[a] Productivity growth = −0.60 + 0.97 output growth (r = 0.90, σ = 0.66)
[b] Productivity growth = −0.29 + 0.62 output growth (r = 0.87, σ = 0.60)
[c] Productivity growth = −0.33 + 0.87 output growth (r = 0.93, σ = 0.58)
[d] Observed — estimated values.
[e] Employment growth = 0.67 + 0.02 output growth (r = 0.05, σ = 0.63)
[f] Employment growth = 0.27 + 0.37 output growth (r = 0.71, σ = 0.58)
[g] Employment growth = 0.38 + 0.11 output growth (r = 0.31, σ = 0.56)

Note that the corresponding equations for the manufacturing sectors were given in table 3.2. See also table 3.10

---

[48] This means of course no absolute certainty: however it diminishes the risk that the correlation between productivity and output is good only because the employment growth is so small.

found relating the growth of output, employment and productivity to the growth of manufacturing output and to levels of income per head, and also between the share of the sector in the economy and the level of income per head. For two of the sectors, mining and miscellaneous services, no useful correlations could be found. For the other four sectors—public utilities, construction, transport and communications, and trade—certain uniform international patterns emerge.

It must be recognised that the precise coverage of sectoral output (and employment) statistics may well differ from country to country. For example, it is impossible to be certain that all transport undertaken directly by manufacturing firms is included in the transport sector's output rather than in that of manufacturing; more serious, the proportion included may vary over time. For this and other reasons, a somewhat pragmatic approach has been necessary in formulating inter-sectoral relationships in terms of standard equations. In principle, the equations cover all west and south European countries and also the United States and Canada; Switzerland, Turkey and Japan had to be omitted for lack of sectoral output data. It was found, in many equations, that a few national divergences from the standard pattern were very substantial, and where the fit could be improved by omitting one, two or even three of the remaining 18 countries from the equation this has been done (the omissions being noted in the specifications of the equations, in the tables). With these reservations, the equations do appear to provide a certain underlying common pattern of change.

Output elasticities

The estimated cross-country pattern of sectoral output elasticities against manufacturing growth is shown schematically in the first part of table 3.12; the related output elasticities against the initial (1953-1955) levels of GDP per head are shown in the second part. The actual observations for the first of these relationships are shown in chart 3.5.

Of the four sectors shown in table 3.12, only public utilities show an output elasticity against manufacturing growth exceeding one. In all the other three—construction, transport and trade—output tends to grow more slowly than manufacturing output. In the fully industrial west European economies, where manufacturing growth rates have been typically 5-7 per cent, construction and transport have typically grown about 80 per cent as fast, and the trade sector slightly faster—about 85-90 per cent as fast as manufacturing.

Secondly, as manufacturing growth rates diminish (or as income per head rises) a clear tendency emerges for the elasticities in all four sectors to increase quite rapidly for public utilities and more slowly for trade, construction and transport. At slow manufacturing growth rates—corresponding to the highest levels of income per head—public utilities output appears to grow around half as fast again as manufacturing output (elasticity in the region of 1½), and output in trade nearly as fast as manufacturing output (elasticity close to 1).

Employment and productivity: for each sector, cross-country correlations have been calculated between the growth rates of output, employment and productivity. Fairly satisfactory results emerge for construction, transport and trade, but not for public utilities (nor for miscellaneous services). In the first three sectors, productivity gains are positively associated with output growth. It was shown above—when similar results were displayed for the non-manufacturing sectors (excluding agriculture) as a whole—that for a given unit of output growth the productivity gain is less, and the employment increase greater, in non-manufacturing than in manufacturing. This finding, that output growth depends much more on employment increases than in manufacturing industry, applies to each of the non-manufacturing sectors reviewed here. The relevant cross-country equations, and the comparison of actual national growth rates with those calculated from these equations, are given where relevant in tables 3.13 to 3.18 for each of the various sectors examined.[49] The results are discussed, sector by sector, below.

Output and employment shares: experiments were also made to find an international pattern of correlations between the shares of each sector in total GDP and total employment, on the one hand, and the level of income per head on the other. No useful correlations have been found for the individual sectors (except for the trade sector). It will, however, be seen later (p. 121 of this chapter) that significant cross-country relationships hold, on a more aggregative level, between income per head and the shares in the economy (both for output and employment) of agriculture, manufacturing and the remaining sectors taken as a whole. The significance of the implied differences in output per head, between sectors, will also be examined there.

The set of underlying common patterns described above provides some rough standards of comparison for examining the sectoral growth patterns of individual countries, sector by sector. It must be recognized that the aim is simply to *identify* special features of the growth pattern in particular countries; it is not always possible to suggest the real reasons for such divergences.

(ii) (a) **Mining and quarrying** (see table 3.13)

The development and size of the mining sector cannot usefully be analysed in the schematic ways suggested above. The situation in each country depends too much on the kind of mining (as between metals, coal and gas). Its growth is related to manufacturing growth only in a very general way.

Mining's share of total output and employment—where it exists on a significant scale—rises above about 2½ per

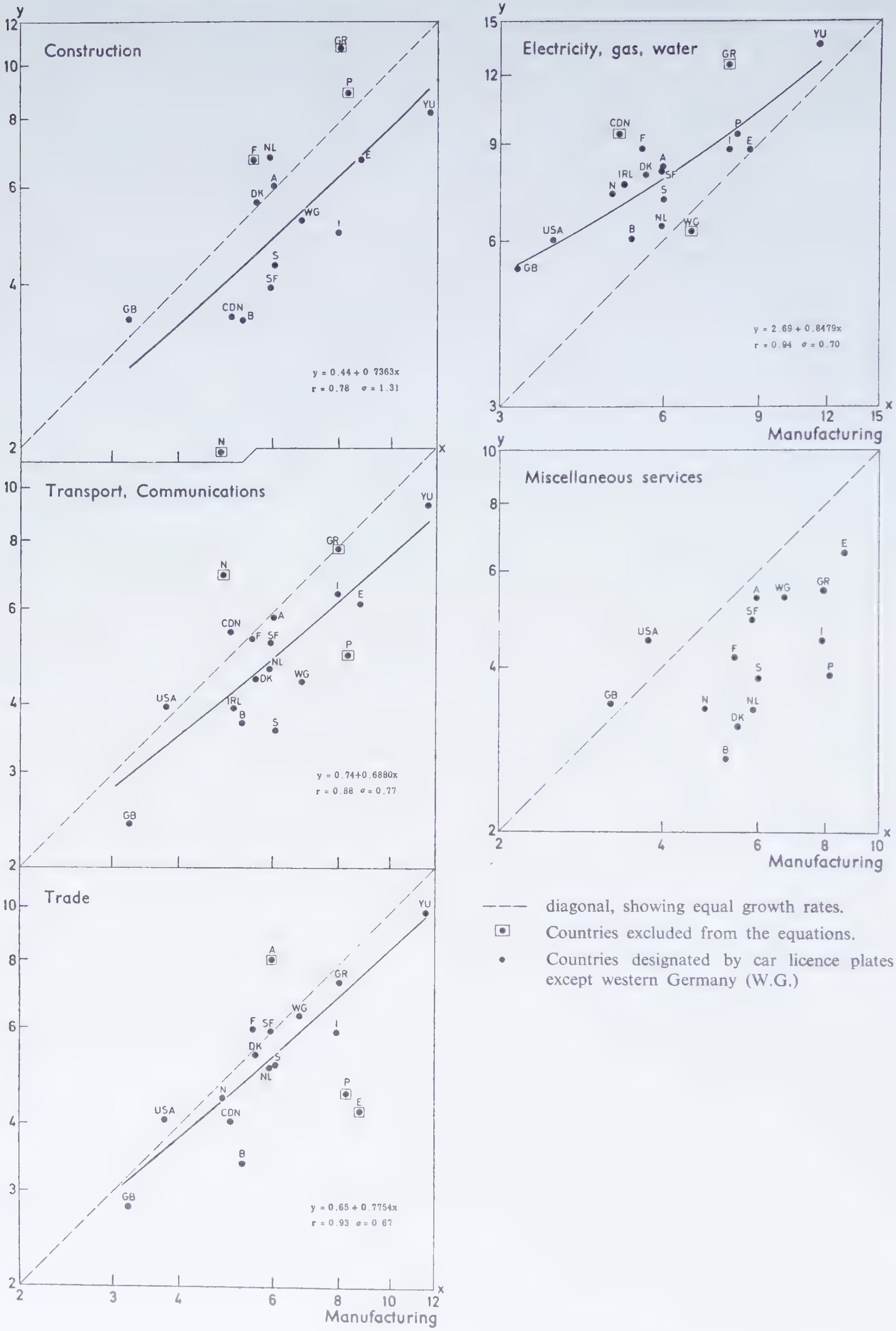
---

[49] In these comparisons, national deviations from the calculated values are shown for output, employment and productivity. The best-fitting forms of regression of employment against output sometimes differ from those for productivity against output, and precise consistency between the calculated values of the three variables has never been achieved. For those reasons, the "calculated" values for employment changes have been derived, in tables 3.15 to 3.17, by dividing calculated productivity into output changes.

CHART 3.5

Output growth in selected sectors compared with output growth in manufacturing, 1953-1967

(Least-square trend growth rates (annual percentage change) Double-logarithmic scale)



--- diagonal, showing equal growth rates.

⊡ Countries excluded from the equations.

• Countries designated by car licence plates except western Germany (W.G.)

cent of total output only in Yugoslavia and Canada (4 per cent in both countries). Its share of total employment is generally rather less—suggesting a relatively high level of pay or profits (Belgium, Italy, Portugal, Spain and the United Kingdom are, however, exceptions). Where coal mining is the main component, output has been falling over 1953-1967 (Austria, Belgium and the United Kingdom) or rising only marginally (western Germany, Spain and United States). But where ore-mining, or natural gas, are important, there has been a marked upward trend (Finland, Greece). Meanwhile, employment has been falling in all the countries considered except Yugoslavia.

In general (and particularly in manufacturing industry), we have found that fast productivity growth tends to be associated with fast output growth, and the reverse. But significant exceptions occur, where either a change in the product mix, or a deliberate policy of reorganization, has resulted in substantial gains in productivity when output has been depressed. Thus mining provides examples of quite marked increases in productivity,

TABLE 3.12

Calculated elasticities of sectoral output growth against manufacturing output 1953-1967

Rate of growth of manufacturing	*1. Elasticities against manufacturing*			
	Public utilities	*Construction*	*Transport*	*Trade*
10	1.12	0.78	0.76	0.84
9	1.15	0.78	0.77	0.85
8	1.18	0.79	0.78	0.86
7	1.23	0.80	0.79	0.87
6	1.30	0.81	0.81	0.88
5	1.39	0.82	0.83	0.90
4	1.52	0.85	0.87	0.95
3	1.74	0.88	0.93	0.99

GDP per head[a] *$*	*Corresponding manufacturing growth rate*	*2. Elasticities against GDP/head*			
		Public utilities	*Construction*	*Transport*	*Trade*
200	12.2	1.00	0.70	0.73	0.75
300	9.4	1.07	0.72	0.74	0.78
400	8.0	1.13	0.74	0.76	0.81
600	6.6	1.21	0.77	0.78	0.85
800	5.9	1.26	0.79	0.79	0.88
1000	5.5	1.30	0.80	0.80	0.90
1250	5.1	1.34	0.82	0.81	0.92
1500	4.9	1.37	0.83	0.82	0.93
2000	4.6	1.40	0.84	0.82	0.94
2500	4.5	1.42	0.84	0.83	0.95
3000	4.4	1.44	0.85	0.84	0.97

[a] In 1953-1955, 1963 factor cost.

Equations

1. The cross-country sectoral *elasticities against manufacturing* have been derived from equations relating sectoral output growth to output growth in manufacturing (least square trends 1953-1967). The parameters of the (linear) equations are as follows:

	a	*b*	*r*	*σ*	*Number of countries* [*]
Public utilities.....	2.69	0.8479	0.94	0.695	15
Construction	0.44	0.7363	0.78	1.31	13
Transport	0.74	0.6880	0.88	0.77	14
Trade	0.65	0.7754	0.93	0.67	14

---

[*] Countries excluded from the equations:
Public utilities: Japan, Greece, Turkey, Canada and Western Germany.
Construction: Japan, Greece, Portugal, Turkey, Ireland, France and Norway.
Transport: Japan, Greece, Portugal, Turkey, Ireland and Norway.
Trade: Japan, Turkey, Portugal, Spain, Ireland and Austria.

2. The cross-country sectoral *elasticities against GDP/head* have been derived from equations relating sectoral output growth (least square trend in 1953-1967) against the initial (1953-1955) levels of GDP per head (at 1963 factor cost, official exchange rates). The parameters of the equations are as follows:

	a	*b*	*r*	*σ*	*Number of countries* [a]
Public utilities .	5.86	$+\dfrac{1254.89}{\text{GDP/head}}$	0.91	0.82	16
Construction ..	3.37	$+\dfrac{1026.69}{\text{GDP/head}}$	0.82	1.22	13
Transport	3.27	$+\dfrac{1113.24}{\text{GDP/head}}$	0.87	0.90	14
Trade	3.88	$+\dfrac{1039.44}{\text{GDP/head}}$	0.85	0.96	14

---

[*] Countries excluded from the equations:
Public utilities: Japan, Turkey, Greece and Canada.
Construction: Japan, Turkey, Greece, Portugal, Ireland, France and Norway.
Transport: Japan, Turkey, Greece, Portugal, Ireland and Norway.
Trade: Japan, Turkey, Portugal, Spain, Ireland and Austria.

The estimated output growth of each sector, for each level of GDP per head, has then been divided by the growth rate of manufacturing industry appropriate to the level of GDP per head. This gives the estimated elasticities. The appropriate growth rate of manufacturing is given by the following equation:

$$\text{Manufacturing growth rate} = 3.81 + \frac{1674.16}{\text{GDP/head}}$$

$r = 0.85$ $\sigma = 1.46$
Data for 18 countries (Turkey and Portugal omitted)

Equation 3.2, see page 59 of this chapter, expresses the same relationship for much the same group of countries, and gives almost identical results. Equation (3.2) was not used here only because of its more complex form.

TABLE 3.13

Mining

Country	Share in total economy — 1963		Rates of growth, 1953-1967		
	Output	Employment	Output	Employment	Output per head
	Per cent		Per cent a year (least square trends)		
Austria	2.4	1.1	−1.08	−2.29	1.24
Belgium	2.5	2.8	−3.39	−6.15	2.95
Denmark	0.1	..	−2.56		..
Finland	0.6	0.3	6.05	−0.08	6.13
France	1.6	0.9	2.43	−3.36	5.99
Western Germany	2.7	2.1	1.00	−3.45	4.60
Ireland	1.3	0.8	7.94	−0.59	8.57
Italy	0.8	0.8	5.35	−1.53	6.98
Netherlands	1.5	1.2	0.77	−2.98	3.86
Norway	0.9	0.6	3.98	−0.49	4.48
Sweden	1.3	0.6	4.34	−1.20	5.61
United Kingdom	2.7	2.7	−1.54	−3.45	1.97
Greece	1.0	..	8.01	..	..
Portugal	0.5	0.7	−1.24	−0.71	−0.53
Spain	1.4	1.5	1.68 [a]	−2.50 [a]	4.28 [a]
Yugoslavia	3.9	1.2	7.52	0.36	7.14
Canada	4.3	1.1	7.49	−2.31	10.02
United States	2.2	1.0	1.78	−2.56	4.45

[a] 1954-1967.

not only where output has been rising strongly (Finland, Yugoslavia, Canada) but also where output has been rising little or falling (as in western Germany, Netherlands, Spain, United States). To some extent (as in France) the reason may lie in the fast development of natural gas while coal-mining has been stagnant, but rationalization has also played a part (as in Belgium, and also in the United Kingdom in more recent years).

(ii) (b) Public utilities (electricity, gas and water) (see table 3.14)

Public utilities account for 2-3 per cent of output in most countries. The shares in total employment are still smaller nearly everywhere. But this is generally the most dynamic of all the sectors, with increases in output of between 6 and 10 per cent a year in most countries (higher still in Greece and Yugoslavia). These fast increases are largely the result of the fast development of electricity, which represents the major part of the sector.

By comparison with the international pattern of output elasticities against manufacturing growth, France —as well as Greece and Yugoslavia—displays exceptionally fast growth; so does Canada. On the other hand, Belgium, western Germany, the Netherlands and Spain have increased output relatively slowly. With only moderate increases in employment, too, productivity growth rates—5 per cent a year or more—have in most countries been substantially faster than in manufacturing industry. Especially striking increases in productivity have occurred in France, Ireland and Sweden; but relatively small increases (4-4½ per cent a year) in Finland and the United Kingdom.

Some explanations of the differences in output growth are suggested by examining the trends in electricity output and industrial consumption:

Per cent a year 1953-1967

(Least squares trends)

	Output of public utilities	Electricity (kwh)	
		Output	Industrial consumption [a]
Austria	8.2	7.5	6.0
Belgium	6.0	6.3	5.3
Denmark	7.8	8.7	8.7 [b]
Finland	8.0	8.0	8.1
France	8.8	7.3	6.9
Western Germany	6.2	7.9	7.6
Ireland	7.6	8.9	9.7
Italy	8.7	7.9	8.0
Netherlands	6.4	8.3	8.0
Norway	7.3	7.4	7.4
Sweden	7.1	6.6	5.9
United Kingdom	5.4	7.4	5.7
Greece	12.4	13.3	14.9
Portugal	10.1	9.8	..
Spain [c]	8.7	10.4	11.7
Turkey	..	11.7	12.5
Yugoslavia	13.6	13.8	15.5
Canada	9.4	..	..
United States	6.1	6.7	8.4

Sources: Public utilities output: table 3.14.
Electricity: ECE, *Annual Bulletin of Electric Energy Statistics for Europe*, Geneva (various issues).

[a] Industry and construction.

[b] Industry only.

[c] 1954-1967.

Table 3.14

Public utilities

Country	*Share in total economy, 1963*		*Rates of growth, 1953-1967*				*Elasticity to manufacturing* [b]
			Output				
	Output	*Employment*	*Actual*	*Residuals* [a]	*Employment*	*Output per head*	
	Per cent		*Per cent a year (least square trends)*				
Austria	2.8	0.8	8.19	0.42	1.81	6.26	1.37
Belgium	2.1	0.8	6.04	−1.12	0.88	5.11	1.15
Denmark	1.7	..	7.82	0.41	..	..	1.40
Finland	3.0	0.9	8.05	0.31	3.88	4.01	1.35
France	1.8	0.6	8.80	1.45	0.93	7.80	1.60
Western Germany	2.0	0.7	6.20	(−2.25)	..	..	0.91
Ireland	2.8	1.0	7.58	0.59	0.62	6.91	1.50
Italy	2.7	0.6	8.72	−0.71	2.23	6.36	1.10
Netherlands	2.4	0.9	6.37	−1.35	1.55	4.74	1.10
Norway	2.8	0.9	7.31	0.52	0.66	6.60	1.51
Sweden	3.3	1.0	7.15	−0.66	0.41	6.71	1.18
United Kingdom	3.1	1.6	5.37	−0.06	0.91	4.42	1.66
Greece	1.7	..	12.44	(2.97)	..	..	1.56
Portugal	2.5	0.5	10.10	0.42	3.42	6.45	1.23
Spain	3.2	0.7	8.69 [c]	−1.41 [c]	3.53 [c]	4.99 [c]	0.99 [c]
Yugoslavia	2.1	0.4	13.62	1.01	7.14	6.05	1.16
Canada	3.3	1.2	9.39	(2.44)	2.61	6.61	1.87
United States	2.5	0.9	6.07	0.17	0.65	5.39	1.60

[a] Residuals (actual less estimated values in respect of manufacturing) as resulting from equations shown in table 3.12. Figures in brackets relate to countries omitted from the equations.

[b] Ratio between trend growth rates in public utilities and in manufacturing output, 1953-1967.

[c] 1954-1967.

Equation: Output growth in public utilities against output growth in manufacturing: see table 3.12.

The relatively fast growth rate of utilities in France disappears if electricity output alone is considered: so do the slow growth rates in western Germany, the Netherlands and Spain. It appears that other components—principally gas—are responsible for the divergences of the output of the sector as a whole in these countries from the international pattern. But Ireland, Greece and Yugoslavia remain fast growers, particularly in industrial consumption of electricity (in Greece, this seems to be due in particular to the establishment of a new aluminium plant which accounts for about one-third of the total industrial consumption of electricity).

The increasing electrification of industry is marked particularly in some of the countries showing the most recent expansion of their manufacturing base: in Ireland, Greece and Turkey, industrial consumption of electricity rose nearly twice as fast as the volume of manufacturing output;[50] the same applies to the United Kingdom and the relationship was even more striking in the United States. In several other countries, the increase in industrial consumption of electricity was generally 30-50 per cent faster than that in manufacturing output (Denmark, Finland, France, Netherlands, Norway, Spain, Yugoslavia). But there remain some countries where industrial consumption of electricity rose little, if at all, faster than manufacturing output (Austria, Belgium, western Germany, Italy, Sweden).[51]

Fast growth of non-industrial consumption of electricity—in households and the service sectors—also contributed to the growth of the public utilities sector. As the table above shows, non-industrial consumption growth rates were particularly fast in Austria, Sweden and the United Kingdom. In the United Kingdom this was associated with a particularly large share of households and of the trade and other services sectors, in the total electricity market (about a third of the market in the early 1950s compared with around 20 per cent in France and western Germany).

(ii) (c) **Construction** (see table 3.15)

Construction as a share of total output varies widely: it accounts for under 5 per cent of GDP in several of the less industrialized countries at the low end of the income scale (Ireland, Portugal, Spain, Turkey) but

---

[50] It should be noted however that " industrial " consumption ncludes more than manufacturing industry.

[51] For growth rates of manufacturing output see table 3.1.

TABLE 3.15

Construction

	Share in total economy, 1963		Rates of growth, 1953-1967						Elasticity to manufacturing [b]
			Output		Employment		Output per head		
Country	Output	Employment	Actual	Residuals [a]	Actual	Residuals [a]	Actual	Residuals [a]	
	Per cent		Per cent a year (least square trends)						
Austria	10.1	6.8	6.01	1.16	1.83	0.61	4.10	0.52	1.00
Belgium	6.4	7.6	3.43	−0.89	2.00	−0.41	1.41	−0.45	0.65
Denmark	8.0	8.3	5.62	1.08	2.51	1.33	3.03	−0.29	1.01
Finland	9.4	10.1	3.92	−0.90	1.92	−0.65	1.96	−0.23	0.66
France	7.8	8.5	6.74	(2.26)	2.76	(2.36)	3.87	−0.20	1.23
Western Germany	7.8	8.0	5.23	−0.21	1.36	−0.94	3.82	0.76	0.77
Ireland	[c]	6.6	1.02	(−3.15)	0.22	(−3.68)	0.79	0.53	0.20
Italy	7.9	10.6	4.96	−1.33	2.14	−1.17	2.76	−0.12	0.62
Netherlands	6.7	9.7	6.82	2.02	2.57	1.92	4.14	0.02	1.18
Norway	7.9	7.9	1.95	(−2.04)	0.35	−2.74	1.59	0.71	0.40
Sweden	10.3	9.4	4.34	−0.54	2.01	−0.35	2.28	−0.19	0.72
United Kingdom	6.5	7.0	3.47	0.66	1.87	0.96	1.57	−0.32	1.07
Greece	6.6	..	10.75	(4.43)	..	..	..	..	1.35
Portugal	5.3	7.9	8.87	(2.37)	3.71	(2.75)	4.98	−0.51	1.08
Spain	5.1	7.9	6.78 [d]	−0.09 [d]	2.46 [d]	−0.21 [d]	4.21 [d]	0.12 [d]	0.78 [d]
Turkey	5.5	..	3.65	..	..	..	..	..	0.63
Yugoslavia	7.6	4.5	8.15	−0.90	2.23	−1.62	5.79	0.78	0.70
Canada	5.1	6.2	3.49	−0.64	2.65	0.46	0.82	−1.08	0.69
United States	4.4	5.6	1.43	−1.79	0.95	−1.73	0.48	−0.05	0.38

[a] Residuals (actual less estimated values in respect of manufacturing) as resulting from equations shown in table 3.12. Residuals for employment have been derived on the basis residuals for output and for output per person employed. Figures in brackets relate to countries omitted from the equations.

[b] Ratio between trend growth rates in construction and in manufacturing output, 1953-1967.

[c] No figure for output level comparable with employment figure.

[d] 1954-1967.

Equations:

1. Output growth in construction against output growth in manufacturing: see table 3.12.
2. Growth of output per person employed in construction (y), against growth of output in construction (x): $y = -0.42 + 0.6663 X$; $r = 0.95$; $\sigma = 0.53$

is no greater at the top end (United States, Canada). This resemblance between the extremes may partly be explained by levels of technical development: the contribution to GDP represents the added value in the construction industry itself and is lower when the amount of " industrialized building " and mechanization—calling for larger inputs from other industries—is greater. In most of the industrial west European countries the range of output shares is from 7 to 10 per cent of GDP.[52] The shares of added values (or of employment in construction itself) may not therefore represent the relative amounts of building activity.

Growth rates of construction output have also varied widely, from as little as 1-2 per cent a year in Ireland, Norway and the United States to 8-11 per cent in Greece, Portugal and Yugoslavia. They are related to the growth of manufacturing, but not with any precision. So far as the rather loose-fitting equation used in table 3.15 goes, it suggests that construction activity has increased quite fast, relatively to manufacturing, in France, and the Netherlands (as well as in Greece and Portugal) but very slowly indeed in Ireland, Norway and the United States. It is possible that the apparent slow growth in the United States may be in part accounted for by the changes in building methods already referred to.[53]

Many other factors obviously influence the growth of construction activity—bound up in many ways with public policy. For one important branch—dwelling construction—policy, combined with demographic factors, has clearly played a role. Thus fast growth in France is associated with a rapid housing development from a very low level in the early 1950s. (In 1953, new dwelling construction in France was less than three dwellings per 1,000 population—the lowest in western Europe—

---

[52] Input-output tables show that the share of inputs to gross output, in construction, is about 60 per cent in the United States (1963) and around 50 per cent in Belgium, Netherlands, France and Italy.

[53] As an example, it may be pointed out that an increase in gross output and added value of 3 per cent a year at a constant input-output ratio of 50 per cent would be reduced to an average increase of 1.4 per cent over fifteen years if the ratio of added value to gross output fell smoothly from 50 to 40 per cent. The different ways of measuring the growth of added value at constant prices (e.g. whether " double deflation ", of both inputs and outputs, is used) will affect the recorded trend of output.

but rose to nearly 9 per 1,000 by 1967). The low rate of growth of construction in Norway and the United States may be associated with the high level of new dwelling construction (about 8 per 1,000) already achieved in the early 1950s, and sustained throughout the period. In the Netherlands, and to a lesser extent in France, the strong population increase must have given a marked impetus to dwelling construction; while the low growth rate of construction in Ireland was associated with the weak demographic situation (population falling, through emigration, until the early 1960s when both population and housebuilding increased). In Italy the growth of construction, and of construction of dwellings in particular, has been rather slow in relation to the general rate of economic expansion; one reason may be the limited amount of government support for housebuilding.

Some of these factors in the growth of construction —factors not directly linked with the general rate of economic growth—must have a significant bearing on any projection. On balance, they suggest for most countries a certain slowing down in the growth of construction, independently of the general rate of economic growth. The tendency for a larger proportion of inputs to added value would work in this way.[54] So would the efforts made during the past 15 years, in most countries, to overtake the initial shortage of dwellings in relation to the number of households and the rising standards of housing.[55]

While many factors break down any precise relationship between construction and manufacturing growth, a very good fit is found between *productivity* gains and output growth in construction (see table 3.15). The estimated productivity increases in construction, from cross-country correlation, range from about 5 per cent a year when output is rising by about 8-9 per cent, down to less than 1 per cent a year for output increases of 1-2 per cent. Experience in the individual countries appears to follow this pattern quite closely.[56]

(ii) (d) Transport and communications (see table 3.16)

The sector covers transport, communications (including PTT) and storage. Two statistical points affect comparative analysis. First, national accounting statistics (and most other economic statistics) naturally cover only commercial transport operations; the growth of traffic by private cars (except for hire) is not included as an element in the growth of the transport sector.[57] Thus the share of transport in the economy, as recorded in national accounts, is substantially affected by the ratio of private to public passenger transport, and the recorded growth of the transport sector is diminished by the extent to which the increasing use of private cars replaces public transport.[58] Secondly, there are differences between countries in the extent to which transport operations of industrial and commercial enterprises are included in the recorded output of the transport sector. This must affect both the transport sector's share in GDP and its output growth.

As recorded in the national accounts, the sector contributes from 6 to 10 per cent of GDP in most countries and (mainly because of high capital intensity in several branches) a slightly lower proportion to total employment. The exceptional country is Norway (17½ per cent of output), where shipping accounts for well over half of the sector's output (the proportion of employment however is only 11 per cent).[59] Other countries with large merchant fleets (e.g. Greece, Netherlands, United Kingdom, Yugoslavia) also show slightly larger proportions than the average. There seems to be no general association between the area of the country, in relation to population, and the proportion of resources engaged in transport—apart perhaps from the rather high proportions, of output and employment, in Canada, Finland and Sweden. On the other hand, the share of transport in the United States is among the lowest—but this may be due to the small share of public transport in total traffic.

Partly for the reasons given above, the recorded growth rate of the transport sector was rather modest —4½ to 5½ per cent a year in most industrial western countries. But it was much faster in Norway, because of shipping, and also in some southern countries (Greece —also in part because of shipping—Spain and Yugoslavia). The growth of transport is fairly well correlated, cross-country, with that of manufacturing output—the elasticity rising from 0.8 at high rates of manufacturing growth to 0.9 at low rates. The main deviations from the

---

[54] This tendency of course largely represents a shift of production from the construction sector itself to manufacturing and other sectors.

[55] " Taking into account the housebuilding rates achieved in individual countries in 1965, the estimated dwelling shortages represent three years or less of housing construction at 1965 rates in most countries " (see ECE, *The Housing Situation and Perspectives for Long-Term Housing Requirements in European Countries*, p. 12, Geneva 1968). But it is recognised that in Austria, Italy and Yugoslavia the shortage is more severe. The estimates of shortages referred to are calculated in various ways; they do not generally take into account the need for " qualitative " improvement in the housing stock, nor do all of them make allowance for new housing needs due to movements of population within the country.

[56] To find so close a fit is surprising in view of the diverse, and often uncertain, methods employed to measure the output of construction at constant prices. The correlation may suggest some rather common bias in the methods of measuring physical output.

[57] The provision of fuel, maintenance, repairs etc. for private cars is of course included as output, but not in the transport sector.

[58] e.g. in the United Kingdom, the recorded volume of output of the transport and communications sector (measured in ton-miles, passenger miles etc, weighted by added values) rose by less than 2½ per cent a year. This includes a *decline in public passenger transport* (passenger miles by road, rail and air, which accounts for about 20 per cent of the 1958 added value in the whole sector) of about 1 per cent a year. Over the same period, estimated passenger miles by *private* transport increased by about 10 per cent a year. Assuming the same added value weight per passenger mile for private and for public passenger transport, inclusion of private passenger transport in the sector's output would increase the output growth of the whole sector from under 2½ per cent a year to about 4 or 5 per cent a year.

[59] The ratio of output to employment in Norway is particularly high for shipping (over 10 per cent of GDP but only 5 per cent of employment); the ratio for the rest of the sector is not very different from that for other countries.

TABLE 3.16

Transport and communications

Country	Share in total economy 1963		Rates of growth, 1953-1967						Elasticity to manufacturing [b]
			Output		Employment		Output per head		
	Output	Employment	Actual	Residual [a]	Actual	Residual [a]	Actual	Residual [a]	
	Per cent		Per cent a year (least square trends)						
Austria	6.7	5.9	5.81	0.95	1.30	0.52	4.46	0.41	0.97
Belgium	7.1	6.8	3.70	−0.66	0.16	−1.01	3.53	0.38	0.70
Denmark	9.7	..	4.47	−0.10	..	..	..	..	0.80
Finland	7.2	7.0	5.20	0.37	2.15	1.15	2.98	−0.81	0.87
France	6.0	5.2	5.30	0.79	1.51	0.85	3.73	−0.10	0.96
Western Germany	6.6	5.7	4.40	−1.01	1.53	−0.36	2.83	−0.62	0.65
Italy	7.1	5.0	6.39	0.19	3.70	(1.86)	2.60	(−1.69)	0.80
Netherlands	8.7	7.0	4.67	−0.14	0.96	−0.25	3.67	0.11	0.80
Norway	17.6	11.0	6.93	(2.87)	0.96	(1.40)	5.90	1.38	1.44
Sweden	8.1	7.6	3.59	−1.30	−0.16	−1.90	3.76	0.66	0.59
United Kingdom	8.5	7.0	2.41	−0.55	−0.45	−0.80	2.88	0.28	0.75
Greece	7.3	..	7.88	(1.65)	..	..	..	..	0.99
Portugal	5.7	3.9	4.90	(−1.50)	1.17	(−1.47)	3.68	0.02	0.59
Spain	5.9	5.2	6.10 [c]	−0.65 [c]	1.63 [c]	−0.85 [c]	4.39 [c]	0.22 [c]	0.70 [c]
Turkey	6.7	..	6.15	..	..	..	..	..	1.06
Yugoslavia	8.3	3.8	9.31	0.53	4.38	1.30	3.73	−0.80	0.80
Canada	8.8	8.0	5.42	1.23	1.30	1.00	4.06	0.18	1.08
United States	6.4	4.8	3.97	0.63	−0.67	(−0.74)	4.67	(1.41)	1.05

[a] Residuals (actual less estimated values in respect of manufacturing) as resulting from equations shown in table 3.12. Residuals for employment have been derived on the basis of residuals for output and for output per person employed. Figures in brackets relate to countries omitted from the equations.

[b] Ratio between trend growth rates in transport and in manufacturing output, 1953-1967.

[c] 1954-1967.

Equations:

1. Output growth in transport and communications against output growth in manufacturing: see table 3.12.
2. Growth of output per person employed in transport and communications (y) against growth of output in transport and communications (x): $y = 1.58 + 0.4247 X$; $r = 0.70$; $\sigma = 0.69$.

international pattern are the relatively fast growth of transport, in relation to manufacturing, in Austria,[60] Norway, Greece and Canada, and the rather slow growth in Belgium, western Germany, Sweden, the United Kingdom and Portugal. One reason for relatively slow growth in the most industrialized countries may well be the diminishing importance of heavy commodities (such as coal, iron and steel, and timber) which make up the bulk of freight traffic on the railways. Sweden, in particular shows a low elasticity of transport to manufacturing growth (only 0.6) indicating an especially marked downward trend in the share of transport in the economy. Moreover, the acceleration of manufacturing growth rates in Sweden during the early 1960s —which appears to be more than cyclical—has been accompanied by a less than proportional rise in transport output; the elasticity of transport has been falling and since about 1960 has been little more than 0.5.

An attempt was made to correlate output of the transport sector with the total domestic output of transportable goods (taken to include the output of the mining, agricultural and manufacturing sectors). Although the more comprehensive determinant variable might seem more appropriate, the fit was in fact somewhat better with manufacturing alone. Probably the reason is that differences between countries in the proportions between domestic manufacturing on the one hand, and domestic mining and agriculture on the other, are largely offset by compensating differences in foreign trade; the " transport content " of domestic production is not very different from that of internationally traded goods.

Employment in the transport sector has generally increased very little—mostly at 1-1½ per cent a year (even falling in Sweden, the United Kingdom and the United States). The exceptional increases are in Italy and Yugoslavia. The usual positive relationship is found between output and productivity increases, with hardly any significant divergences, and with recorded productivity gains generally between 3 and 5 per cent a year. Indeed in nearly all the industrial countries, the recorded productivity gain in transport is about

---

[60] For Austria, one reason may be the rapid growth of transit traffic which has recently accounted for one-third of all commodities entering the country by rail.

1 per cent less than that in manufacturing industry (compare table 3.16 with table 3.1).[61]

(ii) (e) Trade (or distribution) (see table 3.17)

Wholesale and retail trade are the main components of the sector; again, there are some differences in coverage of particular activities between countries,[62] and the recorded share of the sector in the economy may well be influenced by different practices in respect of the separation of the distributive function from the productive, transport and repair activities of enterprises. As recorded, the share of the sector in GDP varies in most countries between about 10 per cent and 15 per cent (rising however to 16 per cent in the United States and falling to 9 per cent in Turkey). In most of the industrial countries it is between 11 and 13 per cent. The shares in total employment are similar, but are generally rather greater than the shares of output in the industrial countries (other than France)[63] but rather less in those southern countries (Portugal and Yugoslavia) for which employment data are available.

Increases in the volume of output are generally measured by the volume of goods distributed; they cannot take much account of changes (which may be important, for the better or worse) in the quality of distributive services. As recorded, the increases in output volume are reasonably well correlated with those in manufacturing output. (As for transport, an attempt was made to correlate changes in output of trade with those in total output of transportable goods, but, no doubt for similar reasons, the correlations fit less satisfactorily than when trade is correlated with manufacturing.)

---

[61] But there are some striking exceptions: Italy has the biggest increase in manufacturing productivity but the smallest increase in transport productivity; however both employment and output data are no more than rough estimates. In the United Kingdom, the increases in productivity in both manufacturing and transport are about equal—and in both sectors among the lowest.

[62] Thus in national accounting data, Ireland combines trade with transport and communications.

[63] In France, however, the available data of output include import duties in the added value of the trade sector. If these were excluded, the sector's 1963 share of GDP would be reduced from the 13 per cent recorded to about 11 per cent, compared with 10 per cent of employment.

TABLE 3.17

Trade

Country	Share in total economy, 1963		Rates of growth, 1953-1967						Elasticity to manufacturing [b]
			Output		Employment		Output per head		
	Output	Employment	Actual	Residuals [a]	Actual	Residuals [a]	Actual	Residuals [a]	
	Per cent		Per cent a year (least square trends)						
Austria	9.6	10.1	7.99	(2.69)	3.17	(2.38)	4.68	0.21	1.33
Belgium	11.4	12.7	3.39	−1.35	1.51	−1.06	1.85	−0.26	0.64
Denmark	14.6	..	5.38	0.41	..	..	..	..	0.97
Finland	10.6	11.4	5.93	0.66	3.21	1.42	2.63	−0.79	1.00
France	13.3	9.9	5.98	1.07	1.88	0.46	4.02	0.58	1.09
Western Germany	11.9	11.9	6.32	0.40	2.27	0.05	3.96	0.34	0.93
Italy	11.3	12.6	5.91	−0.91	2.22	−1.08	3.61	0.20	0.74
Netherlands	13.5	14.2	5.08	−0.17	2.47	0.26	2.55	−0.43	0.88
Norway	13.3	12.0	4.42	0.02	2.17	0.46	2.21	−0.43	0.92
Sweden	11.3	13.0	5.14	−0.20	1.27	−0.99	3.82	0.81	0.85
United Kingdom	11.9	13.8	2.81	−0.35	1.12	−0.20	1.67	−0.15	0.87
Greece	11.1	..	7.25	0.40	..	..	..	..	0.91
Portugal	12.6	7.7	4.59	(−2.45)	1.04	(−3.16)	3.51	0.78	0.56
Spain	10.0	..	4.26 [c]	(−2.50)	..	..	..	..	0.49 [c]
Turkey	9.0	..	5.38	..	..	..	..	..	0.93
Yugoslavia	10.9	4.7	9.74	0.02	4.54	0.41	4.97	−0.40	0.83
Canada	13.5	20.3	4.04	−0.51	2.93	(0.88)	1.08	(−1.37)	0.81
United States	16.3	18.2	4.08	0.50	1.27	0.18	2.78	0.31	1.08

[a] Residuals (actual less estimated values in respect of manufacturing) as resulting from equations shown in table 3.12. Residuals for employment have been derived on the basis of residuals for output and for output per person employed. Figures in brackets relate to countries omitted from the equations.

[b] Ratio between trend growth rates in trade and in manufacturing output, 1953-1967.

[c] 1954-1967.

Equations:
1. Output growth in trade against output growth in manufacturing: see table 3.12
2. Growth of output per person employed in trade (y), against growth of output in trade (x): $y = 0.38 + 0.5125 X$; $r = 0.90$; $\sigma = 0.50$.

The growth of output in the trade sector has in most countries been between 4 and 6 per cent a year. Elasticities against manufacturing growth are 0.8 to 0.9, falling as the growth rate of manufacturing rises, and as income per head falls (see the cross-country elasticity equations in table 3.12). The lowest growth rate for trade—only 3 per cent—is found in the United Kingdom, in accordance with the slow growth of manufacturing. Significantly slower growth rates of trade than the cross-country equation would suggest are shown by Belgium (with an elasticity of trade against manufacturing of only 0.6—one of the lowest), Portugal and —less strikingly—by Italy.

Austria shows the fastest growth rate in output of the trade sector—an increase of 8 per cent a year (and an elasticity against manufacturing growth of 1.3—much higher than in any other country). This fast expansion in output, accompanied by a relatively fast expansion in employment, is well in excess of that shown by the international pattern and goes far to offset Austria's " deficient " growth (in relation to GDP per head), in manufacturing industry. The share of the trade sector in the Austrian economy was rather small, in relation to other countries, at the beginning of the 1950s; much of the gap has been closed by rising incomes generated by fast development (relatively to manufacturing industry) of other sectors, in particular, perhaps, of tourism.[64] France also shows a rather faster growth of trade than is appropriate to the normal relationship to manufacturing; in France, too, the trade share was rather low in the early 1950s (8½ per cent of employment compared with over 10 per cent in western Germany and over 12 per cent in the United Kingdom).

In most countries, employment in the trade sector has risen by 2 to 3 per cent a year (rather less in Belgium, Sweden, the United Kingdom, Portugal, and in the United States; rather more only in Yugoslavia). Increases in productivity have mostly been between 2 and 4 per cent a year, and are fairly well explained by the positive association with the rate of output growth.

(ii) (f) **Miscellaneous services** (see table 3.18)

The sector covers a variety of services, of which the most important are probably banking and other financial services; catering, hotels etc.; professional and scien-

---

[64] Foreign receipts from travel rose by more than 20 per cent a year between 1953 and 1967—the biggest increase for all European market economies.

TABLE 3.18

Miscellaneous services

Country	*Share in total economy, 1963*		*Rates of growth, 1953-1967*			*Elasticity to manufacturing* [a]
	Output	*Employment*	*Output*	*Employment*	*Output per head*	
	Per cent		*Per cent a year (least square trend)*			
Austria	9.5	11.8	5.36	1.88	3.42	0.90
Belgium	20.6	16.0	2.72	2.01	0.70	0.52
Denmark	12.7	..	3.13	..	..	0.56
Finland	13.9	8.6	4.90	3.01	1.83	0.82
France	13.4	14.9	4.16	1.35	2.77	0.76
Western Germany	15.2	15.3	5.34	3.33	1.94	0.79
Ireland	18.6	16.9	..	..	..	..
Italy	15.1	8.9	4.44	1.03	3.37	0.56
Netherlands	13.0	13.4	3.34	2.08	1.23	0.58
Norway	11.5	10.6	3.36	1.16	2.17	0.70
Sweden	14.4	9.4 [b]	3.82	1.17	2.62	0.63
United Kingdom	18.7	14.0	3.43	1.31	2.09	1.06
Greece	18.5	..	5.51	..	..	0.69
Portugal	11.7	11.4	3.87	0.95	2.89	0.47
Spain	17.4	..	6.51 [c]	..	..	0.74 [c]
Turkey	10.6	..	7.31	..	..	1.27
Yugoslavia [d]	5.3	6.3	4.62	1.41	3.16	0.39
Canada [d]	31.7	27.7	3.91	5.43	1.44	0.78
United States	24.0	24.8	4.48	3.35	1.09	1.18

[a] Ratio between trend growth rates in miscellaneous services and in manufacturing output, 1953-1967.

[b] Not comparable with other countries. Excludes not only private health and education but also other service categories included in public administration.

[c] 1954-1967.

[d] Including public administration.

tific services; garages; repair services; entertainments; domestic and other personal services. Where possible, in the present study, education and health services have been left out and are included in public services, but this has not always been practicable. It should also be noted that the output includes ownership of dwellings (for which there are no corresponding employment figures).[65] The sector is, in a sense, the " residual " sector of the economy, whose composition varies a great deal between countries. Moreover, the measurement of output volume for many of the services included here is necessarily arbitrary and methods of measurement differ widely (sometimes, changes in employment are taken as the only measure of changes in output volume). For these reasons, inter-country comparisons are of doubtful value and attempts at systematic analysis have failed to show useful correlations.

The sector's share of the economy, as recorded in national accounts, shows wide variations from country to country—from 10 to over 20 per cent. Because of the inclusion of ownership of dwellings, in which the methods of imputing an output value are particularly diverse, the shares of total employment may be more significant: the range is rather narrower—from just under 10 to just over 15 per cent in western Europe, but rising to 25 per cent in the United States. There are elements of a positive correlation between the share of miscellaneous services in employment and the level of income per head: most countries which are above the midpoint in one respect, are also above it in the other. But the high share of employment in Ireland is a striking exception.[66]

The growth of output, as recorded, varied between 2½ and 5½ per cent but was not apparently related either to the growth of manufacturing or to the level of income per head. However the rate of increase was slower than that of manufacturing output in all countries except the United Kingdom and the United States. (The differences, however, may well be due to the methods of measurement.) The employment increases, again, may be more significant; they are all between 1 and just over 3 per cent a year, but exceed 2 per cent only in Finland, western Germany, Netherlands and the United States. As a whole, therefore, the sector is not a rapidly expanding one; it contains areas of fast expansion, such as catering; but also areas of slow expansion or decline such as (in many countries) public entertainment and personal services.

(iii) Growth and structural change in agriculture[67]

Growth in total gross domestic product has been associated with an increase in agricultural output in almost all countries of western Europe. Only in Norway was there a decline (of about 1 per cent a year). The annual rate of increase of agricultural products in other countries has ranged from 0.4 per cent in Sweden to 3.6 per cent in Yugoslavia. Broadly speaking, the highest growth rates have been experienced in southern Europe (although not in Portugal). The unweighted mean for the five south European countries was 2.6 per cent, while for the twelve industrial countries it was 1.5 per cent, just above the average for the United States and Canada. Table 3.19 shows growth rates in, output, employment and output per person employed, in agriculture and in the rest of the economy, in 1953-1967.

One fact common to all countries emerges: growth in the agricultural sector was considerably less than growth in the rest of the economy. On the average for the twelve industrial countries plus the United States and Canada, the annual growth rate in agriculture was less than one-third of that in non-farming sectors, and for southern Europe just above one-third.

This development is fully in line with the long-term trend towards a declining share of agriculture in total output. It will subsequently be shown to what extent these rates of decline in the relative importance of agriculture in the economy follow a definite rule.

Employment in the agricultural sector declined without exception. The average decline was over 3 per cent per year in the industrial countries of western Europe, as well as in North America, while in the three south European countries providing data on agricultural employment the average annual decline was only 1.5 per cent.

The combined effect of rising output and declining employment is the increase in productivity. In the industrial countries of western Europe, output per head in agriculture has increased at a faster rate than in the rest of the economy, Norway being the only exception. On the average, labour productivity in agriculture has risen at an annual rate of almost 5 per cent, as against 3 per cent in the rest of the economy. Indeed the increase in agricultural productivity has been at least equal to that in manufacturing industry, and in most countries markedly exceeded it, with the exceptions of Norway and Sweden.[68] In the United States, output per head grew in agriculture twice as fast and in Canada three times as fast as in other sectors (again, much faster than in manufacturing). Technical improvements and reorganization in agriculture have clearly played an important role; but it may be suggested that the main reason lies in the adaptation of agriculture to a steadily diminishing labour force—a mechanism almost the reverse of that in most other

---

[65] The estimated (largely imputed) value for ownership of dwellings, as a contribution to GDP, varies between countries from 15 to over 30 per cent of the output of miscellaneous services.

[66] There may be differences in coverage of the data. The low share of employment shown for Sweden is clearly due to a narrower coverage of activities in this sector.

[67] For brevity, the sector covering agriculture, forestry, fishing and hunting (plus whaling for Norway) will be referred to here as " the agricultural sector " or " agriculture ". When reference is made to agriculture only, the sector will be called " agriculture proper ". For most countries, the share of agriculture proper in the output of the whole agricultural sector exceeds 90 per cent. But in some of the Nordic countries (Sweden, Norway and Finland) it is only about one-half.

[68] The unweighted mean increase in manufacturing productivity in 1953-1967 was under 4½ per cent a year (see table 3.2).

TABLE 3.19

Output, employment and output per head in agriculture and in the rest of the economy

(Least square trend rates, 1953-1967)

	Agriculture			*Rest of the economy*		
Country	*Output*	*Employment*	*Output per head*	*Output*	*Employment*	*Output per head*
Austria	1.6	−3.3	5.0	5.6	1.7	3.8
Belgium	1.0	−3.9	5.2	3.9	0.9	3.0
Denmark	1.3	−2.5	3.9	4.9	2.1	2.7
Finland	2.1	−1.8	4.0	5.4	2.5	2.9
France	2.5	−3.5	6.2	5.2	1.3	3.8
Western Germany	2.2	−3.6	6.0	5.8	2.0	3.7
Ireland	1.3	−2.5	3.8	2.8	0.4	2.4
Italy	2.2	−3.4	5.8	5.3	0.4	4.9
Netherlands	2.5	−3.0	5.6	5.0	1.7	3.3
Norway	−1.1	−2.8	1.7	4.7	1.2	3.4
Sweden	0.4	−4.1	4.7	4.5	1.5	3.0
United Kingdom	2.6	−2.7	5.4	2.8	0.7	2.1
Greece	3.1	..	..	6.9	..	..
Portugal	0.9	−2.0	2.9	6.5	1.7	4.7
Spain	3.0	−1.7	4.8	6.7	2.4	4.2
Turkey	2.5	..	..	5.9	..	..
Yugoslavia	3.6	−0.8	4.5	10.6	4.1	6.2
United States	1.1	−3.4	4.6	3.7	1.4	2.3
Canada	1.5	−2.9	4.5	4.7	3.2	1.5

NOTE. — Output is added value (the contribution to gross domestic product) at factor cost, at constant 1963 prices. Employment refers to the number of active people. Productivity, or output per head, has been obtained by relating output to employment.

sectors. The result (except in Norway) has been a narrowing of the gap in output per man between farming and the rest of the economy.

Among the south European countries for which data are available, only Spain shows a rate of increase in agricultural productivity higher than that in the rest of the economy. In Portugal and Yugoslavia, the relatively slow growth of output per head in agriculture substantially widened the gap in output per head between agriculture and the rest of the economy.

Some consequences of these divergent trends in output and employment on structural relationships between agriculture and the rest of the economy are presented in table 3.20. Three-year averages have been used to avoid random variations. Countries are ranked in descending order of GDP per head (official exchange rates) in 1965-1967.

The output shares are shown both at constant 1963 prices and at current prices. The comparison between them indicates *relative price changes* between the agricultural sector and the rest of the economy (see column 5). It should be understood that these " prices " refer to factor costs—that is, to added values (essentially labour incomes and entrepreneurial incomes gross of depreciation)—per unit of output; they do not reflect changes in relative prices paid by final buyers.[69] In this special sense, relative prices in agriculture have declined in almost all the industrial countries; the only exceptions are France, Norway and Belgium. By contrast, the development of relative prices seems to have been favourable to agriculture in all the five countries of southern Europe.

At the same time, the increase in *productivity* in agriculture, relatively to that in the rest of the economy, is reflected in a narrowing of the " productivity " gap, when output per person employed is expressed in constant prices, in all the industrial countries except Norway (column 6 of table 3.20). This narrowing has been particularly marked in the three countries where productivity, thus measured, had overtaken productivity in the rest of the economy—Belgium, Netherlands and the United Kingdom. Elsewhere, the gap remains very wide, and in the southern countries it has not diminished.

A few warnings on the validity of inter-country comparisons of " productivity ", thus defined, are

---

[69] Thus agricultural " prices " exclude distributive and processing costs of food and costs of inputs from other sectors. Prices in the rest of the economy, however, include distributive and processing costs for all sectors. Both agricultural and non-agricultural prices exclude import costs and, of course, net indirect taxes.

TABLE 3.20

Structural relationships between the agricultural sector and the rest of the economy

(1953-1955, 1959-1961 and 1965-1967)

Country and period	GDP per head 1963 United States dollars	Output share		Employment share	Relative factor cost per unit of output 1963=100	Relative output per person employed	Relative income per person employed
		1963 factor cost	Current factor cost				
		Total economy = 100			Rest of the economy = 100		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
United States							
1953-1955	2 542	4.3	5.2	9.2	122	45	54
1959-1961	2 658	3.9	4.0	7.3	103	52	53
1965-1967	3 250	3.2	3.2	5.2	100	60	60
Sweden							
1953-1955	1 434	10.2	11.7	20.2	117	45	52
1959-1961	1 718	8.3	8.4	15.8	101	48	49
1965-1967	2 165	6.5	6.4	11.2	98	55	54
Canada							
1953-1955	1 630	9.5	9.8	18.3	103	48	49
1959-1961	1 745	7.1	6.6	13.1	92	51	47
1965-1967	2 140	6.6	6.5	9.2	98	70	69
France							
1953-1955	1 069	12.3	..	25.9	..	40	..
1959-1961	1 316	10.6	9.3	20.7	86	45	39
1965-1967	1 654	9.0	8.3	16.2	91	51	47
Denmark							
1953-1955	1 088	15.9	19.2	25.4	126	56	70
1959-1961	1 310	13.8	14.3	21.1	104	60	62
1965-1967	1 650	11.3	10.2	16.6	89	64	57
Norway							
1953-1955	1 100	13.6	13.8	26.3	102	44	45
1959-1961	1 262	10.8	10.9	22.3	101	42	43
1965-1967	1 617	7.9	8.2	18.1	104	38	40
Western Germany							
1953-1955	954	8.3	8.5	18.9	103	39	40
1959-1961	1 296	6.6	7.0	13.8	106	44	47
1965-1967	1 589	5.5	5.1	10.7	92	49	45
United Kingdom							
1953-1955	1 183	3.7	5.0	4.8	137	76	104
1959-1961	1 329	3.6	4.0	4.2	112	86	95
1965-1967	1 516	3.6	3.4	3.2	94	112	106
Belgium							
1953-1955	1 032	8.4	8.1	9.3	96	90	86
1959-1961	1 167	7.9	7.4	7.4	93	109	100
1965-1967	1 477	5.9	5.8	5.3	98	113	110
Finland							
1953-1955	922	22.9	24.1	36.6	107	51	55
1959-1961	1 140	20.7	19.8	31.8	95	56	53
1965-1967	1 419	16.5	16.4	25.8	99	57	56
Netherlands							
1953-1955	846	11.6	12.0	13.7	104	82	86
1959-1961	1 013	10.3	10.1	11.1	99	92	90
1965-1967	1 269	8.7	7.6	8.3	86	105	91
Austria							
1953-1955	608	14.5	15.9	31.8	111	36	41
1959-1961	853	11.4	11.8	24.3	104	40	42
1965-1967	1 070	9.1	8.9	20.2	98	40	39
Italy							
1953-1955	549	19.1	21.6	35.6	117	42	50
1959-1961	726	16.2	16.0	29.4	98	46	46
1965-1967	926	13.5	12.7	22.8	93	53	49

TABLE 3.20 (*continued*)

Country and period	*GDP per head 1963 United States dollars*	*Output share*		*Employment share*	*Relative factor cost per unit of output 1963=100*	*Relative output per person employed*	*Relative income per person employed*
		1963 factor cost	*Current factor cost*				
		Total economy = 100			*Rest of the economy = 100*		
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Ireland							
1953-1955	556	22.7	29.6	38.8	143	46	66
1959-1961	618	23.7	25.2	36.9	108	53	58
1965-1967	743	19.8	20.0	31.1	101	55	55
Greece							
1953-1955	317	31.8	31.6	..	99	..	..
1959-1961	408	27.7	26.2	..	93	..	..
1965-1967	580	23.2	24.0	..	104	..	..
Spain							
1953-1955	340	24.4	22.0	45.2	87	39	34
1959-1961	384	23.9	23.5	41.5	98	44	43
1965-1967	576	17.7	17.3	34.2	97	42	40
Yugoslavia							
1953-1955	172	41.0	..	74.1	..	24	..
1959-1961	268	33.3	24.8	67.0	66	24	16
1965-1967	384	24.2	24.0 *	62.5	99	19	19 *
Portugal							
1953-1955	215	30.6	30.7	45.3	100	53	53
1959-1961	271	24.3	24.6	42.0	102	44	45
1965-1967	362	18.5	20.2	34.9	111	42	47
Turkey							
1953-1955	178	46.6	43.5	..	88	..	..
1959-1961	193	42.9	41.9	..	96	..	..
1965-1967	226	36.8	36.6	..	99	..	..

NOTES. — Agriculture covers agriculture, forestry, fishing and hunting (plus whaling for Norway).

Column 1 — Gross domestic product per head of total population, at constant 1963 prices, converted into United States dollars on the basis of the average official exchange rate.

Column 2 — Share of agriculture in total output (gross domestic product) at constant 1963 factor cost.

Column 3 — Share of agriculture in total output at current factor cost.

Column 4 — Share of agriculture in total employment.

Column 5 — Implied price index of agricultural GDP at factor cost (obtained by relating series at current prices by series at constant prices), divided by a similar index for the rest of the economy.

Column 6 — Output per person employed in agriculture, relative to output per person employed in the rest of the economy, has been obtained by relating the output share at constant prices to the employment share, and by dividing the result by a similar calculation for the rest of the economy.

Column 7 — Income per person employed in agriculture, relative to income per person employed in the rest of the economy has been obtained as in column 6, but by using the output share at current prices.

Because of discrepancies in the definition of the active population in agriculture, and also because of differences between countries in the relative capital intensity in agriculture and in the rest of the economy, country comparisons of the indicators of relative output per man and income per man cannot be rigidly established. Time series within each country are valid, with the implication that an increase in the indicator may mean also capital deepening or increase in the return to capital.

necessary. Differences in statistical definitions of active people in agriculture might have considerable biasing influence, especially in respect of female unpaid helpers in agriculture. Nevertheless, on the reasonable assumption that the direction of bias is constant for each country, changes in the gap in relative productivity within a country can be regarded as valid. But inter-country comparisons of relative productivity cannot be rigidly established.[70]

A narrowing of the productivity gap (added value at constant prices per person engaged) does not necessarily mean that the gap in money incomes per person

---

[70] Two countries, Greece and Turkey, had to be omitted from this analysis for lack of suitable employment data. A tentative adjustment of the employment share for the three countries which probably have the largest bias, gives the following correction in the productivity ratio (table 3.20 column 6) in a single year, 1960:

	Number of points
Austria	+ 14
Western Germany	+ 20
Portugal	− 6

The correction has been made by averaging two different adjustments: one which assumes the same ratio between males and females in agriculture as in other sectors, and one which assumes that the number of unpaid female family helpers is proportionate to the number of male farm heads.

engaged, between non-farming sectors and agriculture, has diminished. The income gap is also affected by the change in relative prices (added value per unit of output). The combined effect of changes in relative productivity and in relative prices on *relative agricultural incomes* is indicated in column 7 of table 3.20.[70a] It appears that in some countries where the productivity gap has narrowed, a widening in the income gap took place, notably Austria, Denmark, Ireland and Italy. In the Netherlands and the United Kingdom, two of the countries where relative productivity in agriculture has shown a spectacular increase, there was little change in the relative income. In other countries, such as the United States, Sweden and western Germany, the increase in relative income has lagged behind that in relative productivity. In Yugoslavia, where relative productivity in agriculture tended to decline, favourable relative price developments have approximately balanced losses in relative productivity. In Portugal, increases in relative prices have not been sufficient to counterbalance the fall in relative productivity. An improvement in relative incomes does not necessarily imply that labour incomes per unit of output have increased in agriculture more than in other sectors. The increase might have been associated either with a capital deepening or with a rise in the rate of return on capital.

The pattern of agriculture's share in the economy: a cross-country analysis

The long-term change in the share of an economy accounted for by agriculture has a fairly well-defined pattern which has been widely studied.[71] The decline of the agricultural share in total output appears to be an irreversible process associated with general economic growth.

A statistical test has been made of the pattern of decline of the agricultural share in total output and in total employment, as the income level grows. The test, covering selected countries of western Europe (all those providing suitable data), Japan, Canada and the United States, relates to the three periods 1953-1955, 1959-1961 and 1965-1967.

A significant cross-country correlation is obtained between the values of GDP per head and those of the agricultural share in total GDP (both at 1963 prices), whether the test is made separately for each period or for the three periods taken together. Several equations give a high degree of correlation. The equations retained are the following:

(y = agricultural output as percentage of GDP;
x = GDP per head[a] of total population)

Period	*Number of observations*	*Equation*	*r*	*σ*
1953-1955	20	$y = \dfrac{10^5}{1177.08 + 8.35\,x}$	0.752	5.14
1959-1961	19	$y = \dfrac{10^5}{382.54 + 9\,x}$	0.786	4.93
1965-1967	19	$y = \dfrac{10^5}{611.44 + 8.49\,x}$	0.814	3.96
1953-1955, 1959-1961 and 1965-1967	58	$y = \dfrac{10^5}{863.42 + 8.51\,x}$	0.796	4.35

[a] 1963 prices, in dollars, official exchange rate.

Some of the main deviations are observed in countries where forestry accounts for a large part of the whole agricultural sector, or where the foreign trade balance (negative or positive) for agricultural products is relatively important.

A high degree of correlation is also found between the output share and the employment share, both for each period taken separately and for the three periods together. A linear regression has been retained. The equations and correlation coefficients are the following:

Period	*Number of observations*	*Equation*	*r*	*σ*
1. 1953-1955	18	$y = 0.96 + 1.7070\,x$	0.971	4.19
2. 1959-1961	18	$y = -1.49 + 1.8555\,x$	0.968	4.07
3. 1965-1967	18	$y = -4.67 + 2.2367\,x$	0.935	5.30
4. 1953-1955, 1959-1961 and 1965-1967	54	$y = -0.97 + 1.8431\,x$	0.957	4.67

y = agricultural employment as percentage of total employment.
x = agricultural output as percentage of total GDP.

According to the last equation, representing the pattern of change in the whole period 1953-1955 to 1965-1967, it appears that the employment share tends to approach the output share in a very low region (see chart 3.6).

The main reasons behind the decline in the output share of an economy accounted for by agriculture are well-known. First, the share of food in total expenditure declines as income grows (the veteran Engel's law). Second, the proportion of the total food expenditure that reaches the farmer is reduced by the substitution of inputs from outside agriculture (such as fuel, fertilizers, insecticides) for direct farm activities. In addition, the agricultural share is obviously affected by the degree of dependence on foreign trade.

An analysis of the impact of each of these factors in a recent period is attempted here for fourteen selected countries which provide the data required. Our tentative explanation is limited to the period 1959 to 1965, for which the largest set of data are available. Three-year averages are shown, to avoid random variations. The period is not long enough to show trends, but is at least sufficient to illustrate recent changes and the current situation in the various countries.

[70a] Obviously, the reservations in respect of inter-country comparisons of relative productivity apply also to comparisons of relative incomes.

[71] See in particular A. Simantov, "The Dynamics of Growth and Agriculture", in *Zeitschrift für Nationalökonomie*, vol. XXVII/3, 1967; see also, for example, H. B. Chenery and L. Taylor, "Development Patterns: Among Countries and Over Time" in *Review of Economics and Statistics*, vol. L, No. 4, November 1968.

Data summarizing the interplay of all factors responsible for the level of the agricultural share in total output are shown in table 3.21, where countries are ranked in descending order of GDP per head. The variables have been expressed as percentages of GDP at current market prices (since data on consumers' expenditure are available only in market prices).

The percentage share of food, drink and tobacco consumption [72] is shown in column 2. It is clearly a declining function of GDP per head, but with important deviations from the regression line, especially in the region of GDP per head of $1,200 to $1,500.[73] The main divergences from the equation are the United Kingdom and France, both with substantially higher values than calculated. When, however, expenditure on food alone is taken (also shown in the table), the divergence for the United Kingdom disappears but that for France remains; and Denmark appears with a relatively low value—all countries in the same income range. The main reason appears to lie in relative prices in the countries concerned. The suggestion is that high prices, or indirect taxes, for drink and tobacco (but not for food) account for the United Kingdom's position in relation to the normal curve; high food prices in France, and low ones in Denmark, may account for the relative positions of these countries.

The share of GDP accruing to agriculture is only partly correlated with the food share in consumption. The agricultural share obviously tends to be higher in countries such as Canada, Denmark, the Netherlands and Ireland which are net exporters of agricultural products. And it tends to be lower in countries which rely heavily on imports.

The influence of foreign trade on agriculture's share in an economy can be estimated by a hypothetical calculation designed to show what the agricultural share would be if all food requirements were to be produced domestically (without affecting relative prices) and if there were no exports. The result described as " adjusted " is shown in column 8.[74] It is based on an estimate of the degree of self-sufficiency (column 9) arrived at simply by relating the value of gross domestic agricultural output, at current market prices, to the value of domestic supplies, represented by production, plus imports, less exports.[75] Obviously, this is an over-simplification for several reasons. First, the adjustment relies on the uncertain assumption of an equal ratio between the value of gross output and of value added between domestically produced and imported commodities. Second, the consequences of a hypothetical self-sufficiency in food in terms of inter-sectoral shifts of resources, change in price and cost relationships, and so on, are completely ignored. Third, no allowance is made for the processing content of exported food: this under-

---

[72] For brevity, the expression " food " will be used in the following to indicate food, beverages and tobacco, unless otherwise stated.

[73] The equation is:

Number of observations

41

$$y = \frac{10^5}{2422.12 + 1.40\,x}$$

$(r = 0.919;\ \sigma\ 2.26)$

where

y = food, beverages and tobacco expenditure as percentage of GDP

x = GDP per head 1963 dollars

[74] Strictly, the degree of self-sufficiency should be calculated not only for food, but for all commodities of agricultural origin. However, the net foreign trade balance for non-food products of agricultural origin usually represents a very small percentage of GDP, and can be neglected here. For Norway and Sweden, forest products have been omitted from the agricultural output.

[75] The method used here (with minor differences) is inspired by the calculation made by A. Simantov (*op. cit.*) where the correction is applied to 17 countries for the years 1950 and 1960, as well as to long-term series 1870-1960 for Sweden and to 19 regions in Italy in 1963.

TABLE 3.21

Factors determining the agricultural share in total output

Country and period	GDP per head 1963 US dollars	*Expenditure on food, beverages and tobacco*	*of which: food*	*Agricultural GDP*	*Net food imports*	*Food expenditure not accruing to agriculture*	*Purchased inputs in agriculture*	*Agricultural GDP adjusted for self-sufficiency*	*Degree of self-sufficiency*	*Share of food expenditure not accruing to agriculture*
		As percentage of gross domestic product at current market prices								
	1	2	3	4	5	6	7	8	9	10
United States										
1959-1961	2 658	17.1	13.7	4.0	—	13.1	3.4	4.0	99	77
1961-1963	2 770	16.5	13.1	3.8	−0.1	12.8	3.3	3.8	100	78
1963-1965	2 982	15.7	12.5	3.4	−0.2	12.5	3.0	3.3	103	80
Sweden										
1959-1961	1 718	21.2	16.4	4.4	2.2	14.6	2.8	5.8	76	69
1961-1963	1 854	20.6	15.9	4.0	1.9	14.7	2.6	5.3	75	71
1963-1965	2 036	19.8	15.2	3.7	2.1	14.0	2.4	5.0	74	71
Canada										
1959-1961	1 745	19.8	14.6	5.8	−1.0	15.0	4.5	4.8	121	76
1961-1963	1 810	19.2	14.0	6.0	−1.2	14.4	4.4	4.9	123	75
1963-1965	1 980	18.0	13.1	5.9	−1.6	13.7	4.1	4.5	130	76

TABLE 3.21 (*continued*)

Country and period	GDP per head 1963 US dollars 1	Expenditure on food, beverages and tobacco 2	of which: food 3	Agricultural GDP 4	Net food imports 5	Food expenditure not accruing to agriculture 6	Purchased inputs in agriculture 7	Agricultural GDP adjusted for self-sufficiency 8	Degree of self-sufficiency 9	Share of food expenditure not accruing to agriculture 10
		As percentage of gross domestic product at current market prices								
France										
1959-1961	1 316	26.4	20.4	9.1	1.0	16.3	2.8	9.9	92	62
1961-1963	1 423	25.0	19.9	8.6	0.7	15.7	2.8	9.2	93	63
1963-1965	1 533	23.2	19.1	7.7	0.6	15.0	2.8	8.1	95	64
Denmark										
1959-1961	1 310	22.0	15.4	14.2	−7.6	15.4	7.9	7.8	181	70
1961-1963	1 422	21.2	14.6	12.7	−6.7	15.2	6.9	6.9	184	72
1963-1965	1 530	20.6	14.0	11.6	−6.3	15.3	6.5	6.4	182	74
Western Germany										
1959-1961	1 296	21.8	..	5.1	3.6	13.1	2.8	7.3	70	60
1961-1963	1 393	20.9	..	4.6	3.2	13.1	2.6	6.6	70	63
1963-1965	1 506	19.8	..	4.3	3.0	12.5	2.6	6.1	70	63
Norway										
1959-1961	1 262	21.8	17.6	5.4	2.3	14.1	3.1	6.7	81	65
1961-1963	1 370	21.2	17.1	4.6	2.4	14.2	2.9	6.0	77	67
1963-1965	1 489	20.7	16.8	4.2	2.1	14.4	2.8	5.4	78	70
United Kingdom										
1959-1961	1 329	27.2	19.0	3.6	5.6	18.0	3.4	6.7	54	66
1961-1963	1 373	26.3	18.1	3.4	5.0	17.9	3.3	6.2	55	68
1963-1965	1 456	25.2	17.3	3.1	4.8	17.3	3.2	5.6	55	69
Belgium										
1959-1961	1 167	24.4	19.3	6.7	3.4	14.3	3.0	9.2	73	59
1961-1963	1 277	23.4	18.5	6.3	2.8	14.3	3.1	8.3	76	61
1963-1965	1 390	21.9	17.2	5.8	2.6	13.5	3.1	7.6	76	61
Netherlands										
1959-1961	1 013	22.6	18.3	9.2	−2.4	15.8	6.2	7.4	124	70
1961-1963	1 079	22.3	17.9	8.4	−2.3	16.2	6.0	6.8	123	73
1963-1965	1 171	21.2	16.9	7.8	−1.8	15.2	5.6	6.4	121	72
Austria										
1959-1961	853	27.0	20.6	10.3	2.6	14.1	3.7	12.1	85	52
1961-1963	921	26.2	19.7	9.6	2.1	14.5	3.5	11.2	86	55
1963-1965	994	25.3	18.8	8.7	2.3	14.3	3.5	10.4	84	57
Italy										
1959-1961	726	31.3	25.3	14.2	0.8	16.3	2.7	15.8	90	52
1961-1963	809	30.4	24.7	13.2	1.1	16.1	2.7	14.5	91	53
1963-1965	862	29.9	24.4	12.1	1.7	16.1	2.8	13.6	89	54
Greece										
1959-1961	408	38.4	32.6	23.4	−1.5	16.5	3.1	22.3	105	43
1961-1963	453	36.1	30.7	23.2	−1.5	14.4	3.1	21.9	106	40
1963-1965	516	34.5	29.5	22.4	−1.2	13.3	3.2	21.1	106	39
Spain										
1961-1963	446	36.1	30.9	21.4	−0.4	15.1	2.7	21.0	102	42
1963-1965	513	34.7	29.7	18.4	0.2	16.1	2.7	18.6	99	46

Notes and sources:

Column 1 — Gross domestic product at factor cost, at 1963 constant prices, per head of total population, converted into US dollars.

Column 2 — Total consumption of food, beverages and tobacco, at current market prices, derived from *United Nations Yearbook of National Accounts Statistics.*

Column 3 — Total consumption of food only.

Column 4 — Gross domestic product at factor cost accruing to agriculture, forestry and fishing (agriculture proper for Sweden and Norway). It is represented by the total value of gross production, minus the total value of non-factor inputs (or current operating expenses excluding labour). Sources: as for column 2 and national statistics.

Column 5 — Food exports: items 0, 1, 4 and 22. Food imports: items 0, 1, 4 and 22. An adjustment has been made for Norway, to allow for fish exports. *Source: Trade by Commodities,* OECD.

Column 6 — equals: column 2, minus column 4, minus column 5. This residual item contains, by and large, components of food expenditure not accruing to agriculture. That is: (*a*) non-factor inputs purchased by agriculture, except those which are included in food imports; (*b*) processing and distribution costs for food (in general, the largest item): (*c*) indirect taxes (net of subsidies) included in food prices.

Column 7 — Non-factor inputs purchased by agriculture. This item has been derived from FAO/ECE unpublished material, and for the United States and Canada, from national sources.

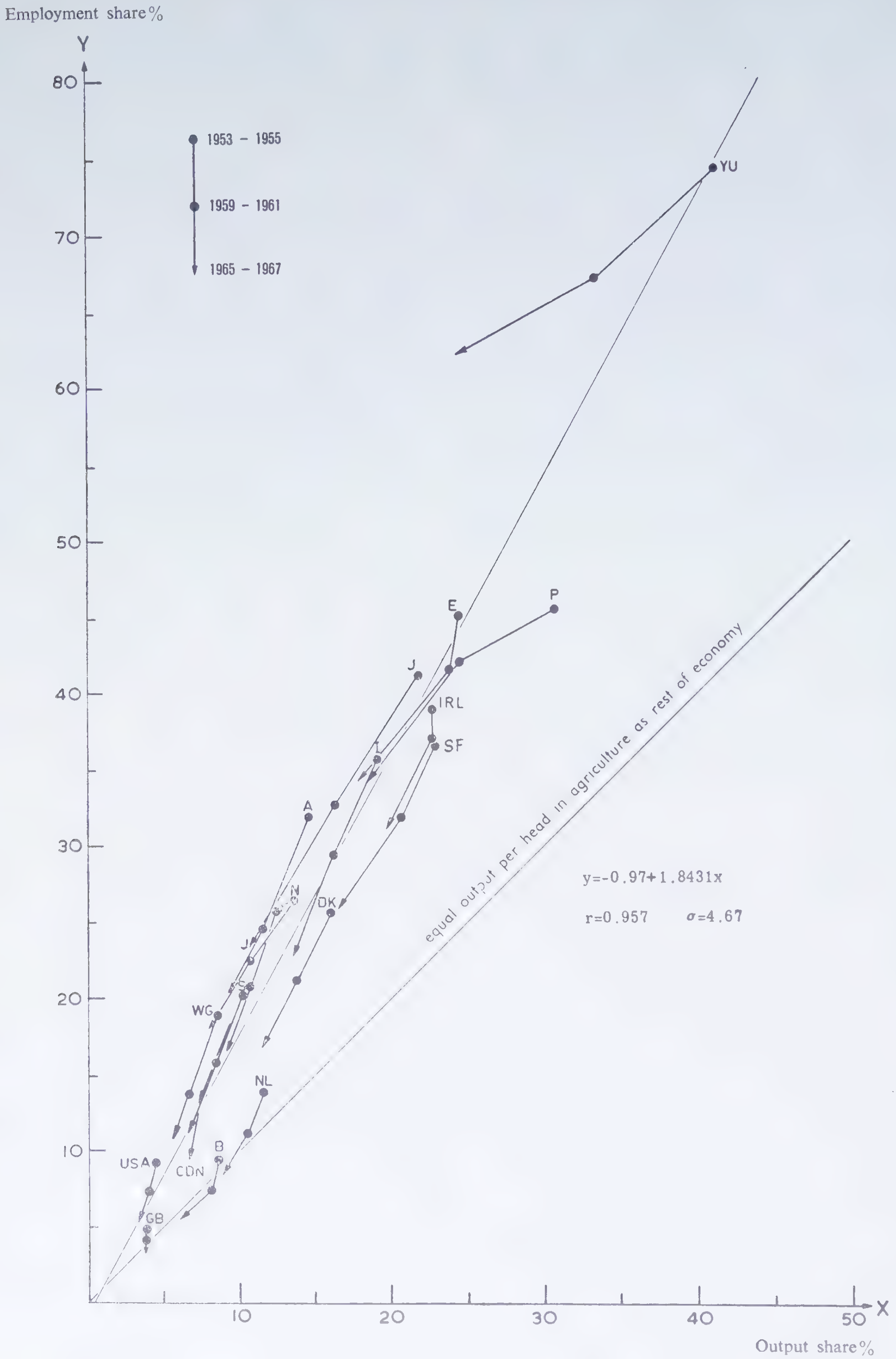
Column 8 — equals: $\dfrac{\text{Column 4}}{\text{Column 9 : 100}}$

Column 9 — The adjustment ratio has been calculated by relating the value of gross domestic agricultural output, at current market prices, with the value of domestic food supplies (production, plus net imports).

Column 10 — Column 6 as percentage of column 2.

CHART 3.6

Share of agriculture in total employment compared with share of agriculture in total output



NOTE.— Countries designated by car licence plates, except western Germany (WG). Agriculture covers agriculture, forestry and fishing. Output is GDP at 1963 factor cost. Data from table 3.20.

states the agricultural output share in countries which export a large amount of manufactured food and vice versa. Nevertheless, the adjustment may present a sufficient degree of approximation to show orders of magnitude.

To reach this purely hypothetical situation of complete self-sufficiency, the largest proportional downward adjustment in the agricultural output share is that for Denmark, followed by those for Canada and the Netherlands. The largest upward adjustments are those for the United Kingdom, western Germany, Sweden and Belgium. The range of agricultural shares after the adjustment appears to be narrowed, and the regression line calculated gives a higher correlation coefficient against the level of GDP per head, and a reduction in the standard error of estimate. The equations obtained are the following:

x = GDP head. y' = agricultural share of GDP — unadjusted.

y'' = agricultural share of GDP — adjusted for self-sufficiency in food.

Number of observations

41 $$y' = \frac{10^5}{2001.44 + 10.20\,x} \quad (r = 0.736;\ \sigma = 3.54)$$

41 $$y'' = \frac{10^5}{519.91 + 10\,x} \quad (r = 0.951;\ \sigma = 1.44)$$

The data, in relation to the second equation above, are displayed in chart 3.7.

There is still a rather wide range between countries with income levels in the region of \$1,000—\$1,500 (France, Denmark, the Netherlands, Norway and the United Kingdom). These divergences could in part be explained by differences in relative prices.[76] An adjusted agricultural share lower than is appropriate to the given income level may be regarded as a *prima facie* indication of relative efficiency in the use of agricultural resources to meet food requirements at that income level (the case of the Netherlands). A higher figure (as for France) may correspondingly indicate above-average absorption of resources in agriculture in relation to food requirements.

The residual shown in column 6 of table 3.21 is a composite item. It covers: part of the current non-factor inputs purchased by agriculture, and more precisely those which are domestically produced; processing, marketing and, more generally, service costs included in total food value at consumer level; and indirect taxes, net of subsidies, related to food. The tax item being relatively small, this residual represents a large part of the retail food expenditure which accrues to domestic sectors other than agriculture.[77]

The part of the total food value, at consumer level, which accrues to non-farming sectors is a share of total GDP varying within a narrow range—13 to 18 per cent—in the various countries, irrespective of their income level, and tends to remain rather constant within each country. Purchased inputs by agriculture (shown in column 7) tend to remain, within each country, a constant ratio of GDP, and this ratio is also rather uniform—about 3 per cent—among a large number of countries.[78] But in Denmark and the Netherlands it is two to three times as large; the reasons are certainly connected with the relatively large size of their agricultural sectors, producing largely for export.

The share of food expenditure accruing to sectors other than agriculture is expressed as ratio of food consumption in column 10. It appears to increase as the proportion of food expenditure to GDP declines (and as income per head rises). Statistical tests show significant degrees of correlation (see chart 3.8).

y = food expenditure not accruing to agriculture as percentage of total food expenditure

x = food expenditure as percentage of GDP

x' = GDP per head

Number of observations		r	σ
41	$y = 106.739 - 1.783\,x$	-0.919	4.34
41	$\log y = 1.929 - \dfrac{145.283}{x'}$	-0.922	4.52

Minor deviations could be simply explained by errors in the estimate of this residual item in food consumption. It is possible that an adjustment to allow for the processing content of foreign-traded food and for exports of non-food agricultural products[79] would reduce somewhat the spread of observations around the regression line.

Projections of agricultural output to 1980

Tentative projections to 1980 of agricultural output and employment are presented here. As already indicated, we propose for the projections to treat agricultural output as " exogenous " rather than as determined by other economic variables. Our output projections are therefore based on recent projections of the gross volume of agricultural output made by the secretariat of OECD.[80]

---

[76] The possible explanation that the Netherlands (for which a negative deviation from the regression line appears) relies heavily on imported feeding-stuffs and that these purchased inputs would tend to lower the value added in agriculture, compared with countries where feeding-stuffs are mostly produced by domestic agriculture (and so contained in the value added by agriculture), is not valid. In fact, imported feeding-stuffs, which are not included in value added, have been added—together with other food imports—in our adjustment for self-sufficiency.

[77] Strictly speaking, it contains also the processing content of exported food, for which allowance could not be made. This could be of some importance for the two largest net food exporters, Denmark and the Netherlands. For these two countries, the residual should be considered slightly lower than appears. The residual for countries importing processed food should be adjusted slightly upward.

[78] A. Simantov has also shown that the share in Sweden has remained rather stable for the last century. *Op. cit.*, pp. 340-342.

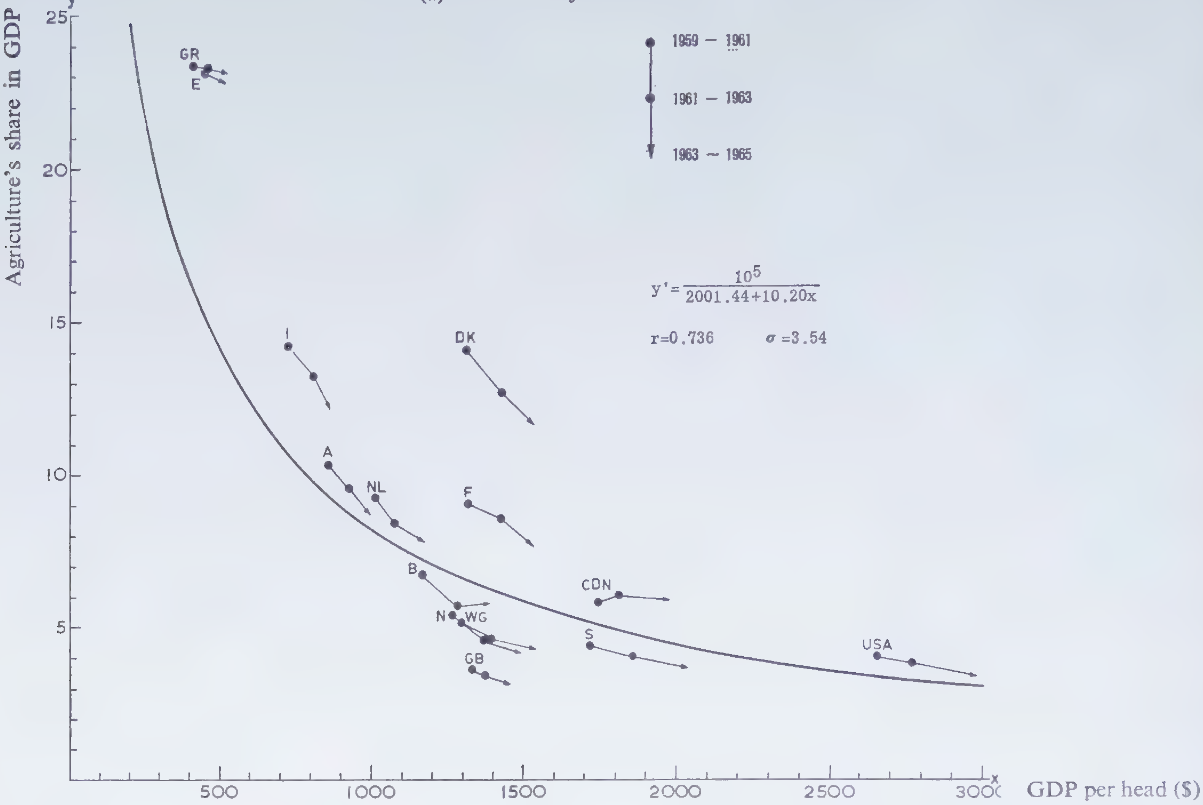
[79] However for Norway and Sweden, forest products have been excluded from agricultural output in table 3.21.

[80] OECD, *Agricultural Projections for 1975 and 1985*, 1968.

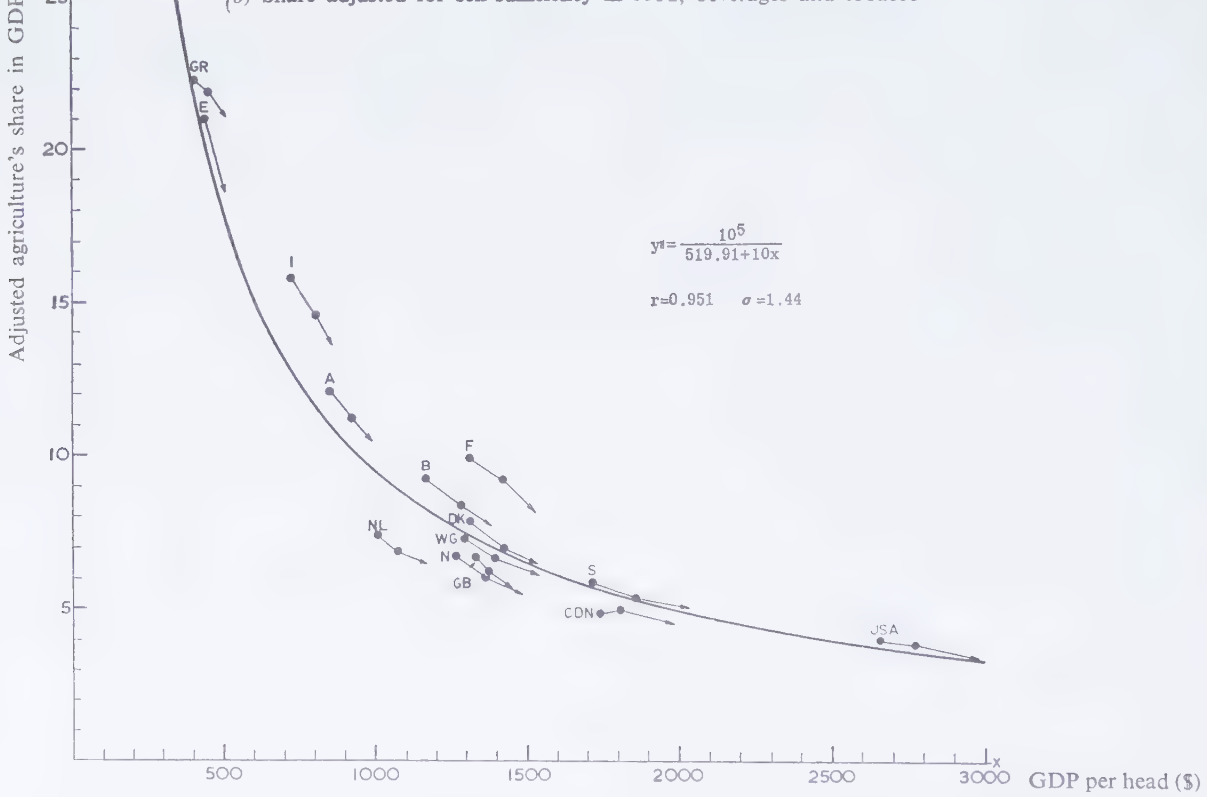
CHART 3.7

Share of agriculture in GDP compared with level of GDP per head

(*a*) Share unadjusted



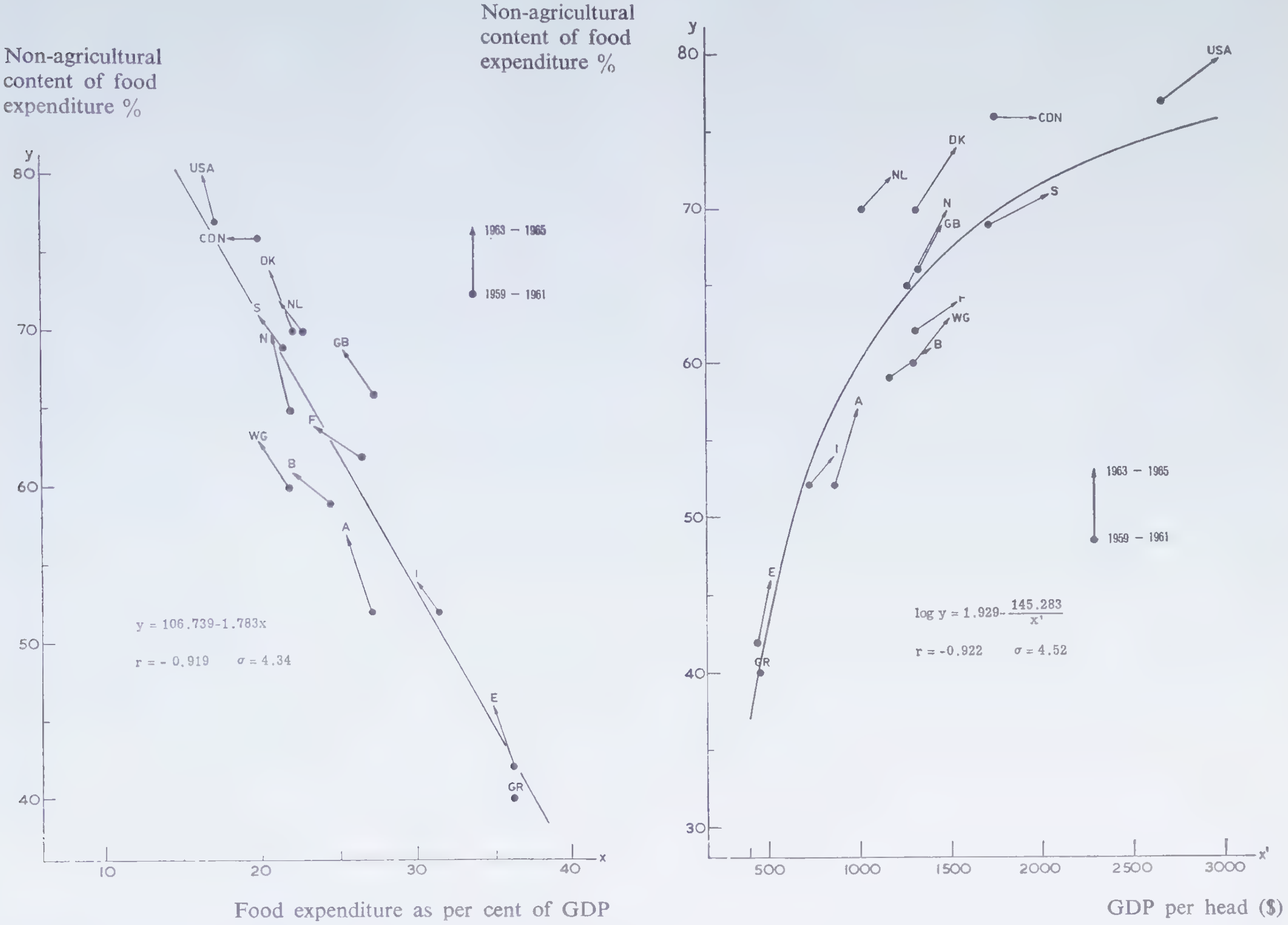
(*b*) Share adjusted for self-sufficiency in food, beverages and tobacco



NOTE.— Countries designated by car licence plates, except western Germany (WG). GDP per head is at 1963 factor cost in US $ at official exchange rates. The self-sufficiency ratio, used for adjusting the share of agriculture, obtained by relating the value of gross domestic agricultural output, at current market prices, to the value of domestic supplies (production, plus imports, less exports). Data are from table 3.21.

CHART 3.8

Non-agricultural content of food expenditure



(a) *Non-agricultural content of food expenditure compared with share of food expenditure at current prices in GDP*

(b) *Non-agricultural content of food expenditure compared with level of GDP per head*

NOTE.— Countries designated by car licence plates, except western Germany (WG). GDP per head is at 1963 factor cost in US $ at official exchange rates. Food covers food, beverages and tobacco. Data are from table 3.21.

We shall show later that these are not seriously out of line with the general international pattern of agricultural development displayed above.

These projections appear to have been made broadly in the same spirit as our own general economic projections. They are explicitly described not as forecasts but as extrapolations " on the assumption that present price trends will continue and that policies will remain unchanged ".

The OECD output projections are based on a country by country examination of production trends and prospects for each of the major categories of food and feed. The products studied cover, for most countries, 80 per cent or more of total agricultural output and the sum of the projections is regarded by OECD as representative of total agricultural output.[81] In principle, the projections of output are made independently of demand trends. But certain exceptions are admitted (such as poultry meat, pig meat and eggs). More generally, to the extent that the projections rely in part on extrapolations of past trends which have necessarily been influenced by the development of demand, the output projections must incorporate a certain element due to the trend in demand patterns.

The main features of the OECD projections are:

(*a*) A considerable slowing down in the growth rate of agricultural production in most of the industrial countries in western Europe, compared with the period since 1952. The basic reasons for this slowing down are stated to be (i) the trends towards stabilizing or reducing the cultivated areas and (ii) the expectation that yields in the advanced countries will reach during the 1970s " a level closer to the optimum situation ". This presumably implies an economic optimum in terms of current costs and prices; any such calculation—which must vary from country to country—is obviously difficult to make and the evidence is not fully deployed in the OECD report. It is recognized, however, that unforeseen technical developments may succeed in raising this optimum.

---

[81] The products studied do not include fruit and vegetables, forest products, tobacco, cotton or other agricultural materials. For the south European countries and Italy, the commodities studied cover only 50 to 60 per cent of total output. In general, it is thought that not very different rates of growth can be expected for the total of these excluded products but this may not always be true of countries where forestry and fishing represent a large part of the " agricultural " sector. For forest products, see *European Timber Trends and Prospects 1950-1980* (Supplement 7 to Volume XXI of the *Timber Bulletin for Europe*). This joint study by the ECE and FAO suggests that the OECD projections for agriculture proper would not in total be very greatly affected by the expected increase in output of forest products.

(*b*) The projected slowing down of output growth does *not* apply to the projections for Ireland, Italy, Portugal, Switzerland or Yugoslavia (until after 1975). In these countries, current trends and policies are expected to lead to some acceleration of agricultural output growth.

The OECD projections are made separately for the periods 1961-1963 to 1975, and for 1975 to 1980. They indicate a further slowing down after 1975, even in the countries where output growth is taken as accelerating in the first part of the projection period. The country projections are summarized in the first three columns of table 3.22 and compared with the past trend. Both figures are in terms of *gross value* of final production at constant prices.

Projections of output of certain basic commodities have also been made by the FAO, on rather similar principles, as part of the studies for the World Indicative Food Plan.[82] The OECD projections appear broadly in concordance with those of the FAO, in that they also imply a slowing down in future growth rates in most western European countries.

One main purpose of the OECD, as of the FAO's projections, was to confront the current trends in output with those in demand—to set out quantitatively the imbalances to which current trends are leading.[83] It becomes clear from the individual commodity projections that—even allowing for the assumed slowing down in output growth—current trends and policies, together with the present organization of farming, will

---

[82] FAO, *Agricultural Commodities: Projections for 1975 and 1985*, 1967.

[83] The corresponding demand projections are made principally by detailed analysis of trends in consumer demand, based on growth rates of real domestic product which are not very different from our projections.

TABLE 3.22

Growth rates of gross agricultural production and added value

(Per cent a year)

	Gross agricultural production (at 1963 market prices)			*Added value (at 1963 factor cost)*			
		OECD projections			*Projections*		
Country	*Actual 1952-1954 to 1961-1963*	*1961-1963 to 1975*	*1975 to 1985*	*1953-1967 Least square trend*	*1961-1963 to 1975*	*1975 to 1980*	*Taken from 1965-1967 to 1980*
Austria	3.3	1.8	0.9	1.58	1.9	0.8	1.5
Belgium	2.1	1.3	0.9	1.01	1.1	0.6	0.9
Denmark	2.1	0.8	0.6	1.29	0.2	0.2	0.2
Finland	2.1	1.9	1.3	2.12	1.5	1.1	1.4
France	2.6	2.3	1.3	2.41	1.9	1.1	1.6
Western Germany	2.1	1.9	1.0	2.20[a]	1.7	0.8	1.4
Ireland	2.2	3.3	1.4	1.18	2.2	1.0	1.8
Italy	1.9	2.7	2.3	2.19	2.2	1.9	2.1
Netherlands	2.0	1.4	1.1	2.49	1.3	0.9	1.2
Norway	0.5	−0.3	1.0	−1.11	−1.7	−0.6	−1.3
Sweden	−0.2	0.6	−0.1	0.38	−0.4	−1.3	−0.7
Switzerland	0.8	1.7	1.4	0.5[b]	1.7	1.3	1.6
United Kingdom	3.0	2.4	1.6	2.67	2.7	1.8	2.4
Greece	4.5	3.3	2.1	3.10	3.0	1.9	2.6
Portugal	0.9	2.0	1.0	0.89	1.8	1.6	1.7
Spain	2.9	2.9	1.7	3.01	2.5	1.5	2.2
Turkey	3.4	2.4	2.3	2.50	2.5	2.4	2.5
Yugoslavia	4.6	4.6	2.0	3.0[b]	3.3	1.5	2.7

Source: derived from OECD, *Agricultural Projections for 1975 and 1985* (1968), table 12, page 50.

NOTE. — Gross agricultural production represents total final agricultural output, net of imported feeding stuffs and store cattle.

Projections relate to the products studied, net of grains used for feed (but not of concentrated feeding stuffs).

Value added 1953-1967 trend taken from national accounts worksheets (contribution of total agriculture, forestry and fishing to GDP at constant 1963 factor cost).

Projections are taken from gross agricultural production, adjusted to added values by the equations in table 3.23 (except for Denmark, Norway, Sweden and Yugoslavia for which the adjustment is arbitrarily chosen).

[a] 1954-1966.

[b] Estimated from figures of gross production increase.

continue to lead towards big changes in the western European supply/demand balance which would have important repercussions on trade with the rest of the world; these changes, if realized, would in particular imply a very substantial fall in the grain imports of western Europe as a whole from the rest of the world and, as is now well enough known, a large surplus of dairy products. For beef and veal, on the other hand, the confrontation of these output projections with demand projections for the area indicates an increasing deficiency of supply. This conclusion must be borne in mind in assessing the realism of the output projections.

The OECD projections of over-all output in the left hand part of table 3.22 (and the comparable statistics for the past) relate to the *gross value* (at constant prices) of final production.[84] To fit into the projections of GDP used in our present work, these agricultural output projections must be converted into indices of added value at constant prices. This conversion requires an assumption about the trend of the ratio of current non-factor inputs, from other sectors or from imports, to gross production. To establish this relationship more firmly for the projections requires more thorough study than has been possible so far. The calculations which follow are based largely upon data for the period 1957-1959 to 1963-1965 collected for a study of output and expenses in agriculture under preparation by the FAO/ECE Agriculture Division.[85] The comparative results are broadly consistent with the input-output coefficients for agriculture resulting from a number of broadly comparable input-output tables now under analysis by the secretariat.

The ratio of inputs to output in agriculture varies immensely between countries according to the level of development and pattern of output. It is as high as 50 per cent in the United Kingdom, around 40 per cent in most of the other western European industrial countries (including Denmark and Ireland but with the exception of France and Italy, where it is 20 to 25 per cent) but falls to 10 to 20 per cent in southern Europe. Moreover, the proportion of inputs to outputs, as might be expected, has generally been increasing. Hence the rate of growth of added value in agriculture, which is the figure we require, has generally been significantly less than that of gross output.

Added values appear to have grown by about 1 per cent a year less than gross output (both at constant prices) in most of the more advanced countries (in 1957-1959 to 1963-1965); but the difference is much less than 1 per cent in the United Kingdom (where the proportion of inputs is already very high), in France and Denmark and in most of the southern European countries (where the proportions of inputs are rather low).

A careful projection of the growth of the agricultural contribution to GDP would require, *inter alia*, detailed assumptions about the future pattern of production by commodities. For the time being, a short cut has been taken. Linear regression equations have been calculated for most countries relating changes in gross production to those in added value (at constant prices) during the years 1957-1965, and the resulting coefficient has been applied to the OECD gross production projections to yield our projection for added value. The equations are shown in table 3.23.[86]

The resulting projections of agricultural output volume (added value) are shown in the right hand side of table 3.22 and are compared with the trend values for the growth of agricultural output in 1953-1967 as

TABLE 3.23

Regression of added value in agriculture (y) to gross agricultural output (x) (at 1963 market prices) 1957-1965

Country	*y*	*Correlation Coefficient (r)*	*Current inputs as per cent of x (1963-1965)*
Austria	$1277 + 0.69\,x$	0.906	27.6
Belgium	$15582 + 0.40\,x$	0.658	37.3
Finland	$371 + 0.62\,x$	0.942	22.0
France	$7067 + 0.60\,x$	0.970	25.2
Western Germany	$3256 + 0.52\,x$	0.777	37.5
Greece	$3069 + 0.78\,x$	0.995	13.4
Ireland	$62.5 + 0.42\,x$	0.889	31.6
Italy	$898 + 0.61\,x$	0.978	19.4
Netherlands	$674 + 0.48\,x$	0.919	43.5
Portugal	$1671 + 0.78\,x$	0.997	11.9
Spain	$24254 + 0.74\,x$	0.974	14.4
Switzerland	$243 + 0.60\,x$	0.865	33.6
Turkey	$1901 + 0.91\,x$	0.994	14.9
United Kingdom	$-173 + 0.56\,x$	0.980	53.6

---

[84] The indices of total agricultural output for past years (as in table 3.22) relate to the volume of gross total output net of imported feeding stuffs and store cattle. The indices summarizing the projections for the commodities studied are net of grains used for feed (but not of other concentrated feeding stuffs). See OECD; *op. cit.*, table 12, page 50.

[85] *Sixth Report on Output, Expenses and Income of Agriculture in European Countries* (ST/ECE/AGRI/30).

[86] The data are derived from the worksheets used in the FAO/ECE study referred to above. Available data for Yugoslavia are not strictly comparable; for Denmark data at constant prices are not available; for Norway and Sweden no useful correlation was found. For these countries, an arbitrary extrapolation of the share of inputs was made.

recorded in the national accounts. According to these projections—which, it should be recalled, reflect basically an interpretation of current trends and policies—agricultural output growth in the fully industrialized countries would be fastest (nearly 2½ per cent a year) in the United Kingdom, which has had the highest agricultural growth rate in the past (but also the lowest degree of self-sufficiency). In most of the other countries, the projected agricultural growth rate is put at between 1 and 2 per cent a year. The exceptions among the more industrialized countries are Norway and Sweden where declining agricultural output is projected and Denmark where output is taken as stationary.[87] Among the southern countries, output is taken as increasing by 2 to 2½ per cent a year in Greece, Spain, Turkey and Yugoslavia. The margins of uncertainty in terms of total output growth are not, in fact, very wide. Thus for most industrial countries, the range of agricultural growth rates is taken to fall from around 1½ to 2½ per cent a year in the past to between 1 and 2 per cent a year in the projection period.

By anticipating the projections of GDP in all sectors other than agriculture, to be described in section 5 below, we can express the agricultural output projections as shares of projected GDP in 1980. These shares can then be compared with the calculations already described which display a certain international pattern in agricultural shares in the economy in relation to the level of income per head.

Our projections in fact appear reasonably consistent with the equations derived from cross-section analysis and time series for the periods 1953-1955, 1959-1961 and 1965-1967, bearing in mind the considerable deviations from calculated values shown in some cases (see chart 3.8). (An adjustment to allow for the degree of self-sufficiency in food is not practicable in respect of the projections.) The general result is that in most of the industrial countries, the share of agriculture in GDP implied by the projections settles down by 1980 at 3 to 6 per cent, while for southern European countries the shares will range between 10 per cent and 20 per cent. The output shares in 1980 obtained from our calculations are shown in table 3.24 and represent the basis for the projection of employment in agriculture.

Projections of agricultural employment

Some possible projections of changes in agricultural employment, from 1965-1967 to 1980, are tentatively outlined here.

We already have the projected evolution of the agricultural share of GDP from the output projections just described (see table 3.24, columns 1 and 5). We can also make use of projections of the total labour force in 1980 already made by the Secretariat.[88] (Subsequently, in section 5 of this chapter, we shall see how far these total labour force projections are consistent with the projections of total output but minor variations in them would not much affect the present calculation).

To derive projections of agricultural employment (and, by implication, of non-agricultural employment) we introduce two alternative hypotheses about the future development of relative productivity (added value per person engaged, at 1963 factor cost).

Hypothesis I is that output per head in agriculture, relative to the total economy, will remain constant at its 1965-1967 ratio. For most countries, this implies the persistence of a relative depression of the agricultural sector, contrary to general policy targets. This hypothesis can be taken as implying something like the *minimum* decline in agricultural employment which can reasonably be considered.[89]

Hypothesis II is that relative productivities will change in accordance with the equation on page 101 above, which shows a reasonably well-fitting correlation between the shares of agriculture in total output and in total employment.

These alternative hypotheses are applied in table 3.24. In this table, countries are divided into two groups. Group II covers the countries which have, in the past, experienced a labour surplus and most of them have tended to be migration countries; they are also the countries with the largest shares of agriculture in their output and employment structures (well over 20 per cent for employment). The remaining west European countries (all the countries classed in this study as " industrial ", except for Italy, Finland and Ireland) make up Group I.

Both hypotheses show, of course, a reduction in the employment share in agriculture, in all countries, between 1965-1967 and 1980. Hypothesis II reflects the international pattern derived from past experience, by which relative productivity in agriculture rises as the agricultural share of output falls and as GDP per head increases.

Once the totals for agricultural employment in 1980 were so determined, the total labour supply for the rest of the economy was derived as a residual. Projected rates of change in employment in agriculture and in the rest of the economy are shown in table 3.25, compared with past rates of change.

It must be observed that declines in farm employment (both past and future) are not necessarily shifts to other activities. They may result from departures from the labour force, by death, retirement, or simply withdrawal. The estimated changes in non-agricultural sectors represent the total *net supply* of labour for these sectors, derived from demographic developments in the domestic population, changes in age- and sex-specific activity rates and shifts from agriculture. It is, nevertheless, true that a *very large* decline in agricultural

---

[87] In Norway, Sweden and Denmark *gross* agricultural output is, however, projected as increasing slightly.

[88] See *Economic Survey of Europe in 1968*, chapter III, especially appendix IX.

[89] It was noted above that changes in relative productivity in the past, at constant prices, have not necessarily been the same as changes in relative money incomes, because of changes in agricultural prices (factor costs per unit of output) relatively to other prices. To determine the effect on relative incomes of any projections of relative productivity would require a further assumption about relative prices.

TABLE 3.24

Shares of the agricultural sector in output and employment in 1965-1967 and projected in 1980

(Percentages)

Country	*Actual in 1965-1967*				*Projected in 1980*		
			Relative output per head			*Employment share*	
	Output share (at 1963 prices)	*Employment share*	*total economy = 100*	*other sectors = 100*	*Output share (at 1963 prices)*	*Hypothesis I*	*Hypothesis II*
	1	*2*	*3*	*4*	*5*	*6*	*7*
Group I							
United Kingdom	3.6	3.2	*112*	*113*	3.0	2.7	2.7
Western Germany	5.5	10.7	*51*	*49*	3.6	7.1	5.6
Switzerland	5.5 *	8.1	*68*	*66*	3.7 *	5.4	5.4
Belgium	5.9	5.3	*111*	*112*	3.8	3.4	3.4
Sweden	6.5	11.2	*58*	*55*	3.1	5.3	4.7
Norway	7.8	18.1	*43*	*38*	3.5	8.1	5.5
Netherlands	8.7	8.3	*105*	*105*	5.5	5.2	5.2
France	9.0	16.2	*56*	*51*	6.0	10.7	10.1
Austria	9.1	20.2	*45*	*40*	5.9	13.1	9.9
Denmark	11.3	16.6	*68*	*64*	6.5	9.6	9.6
Group II							
Italy	13.5	22.8	*59*	*53*	8.8	14.9	14.9
Finland	16.5	25.7	*64*	*57*	10.6	16.6	16.6
Spain	17.7	34.2	*52*	*41*	10.2	19.6	17.8
Portugal	18.5	34.9	*53*	*42*	9.8	18.5	17.1
Ireland	19.8	31.1	*64*	*55*	13.5	21.1	21.1
Greece	22.8	50.1 *	*46*	*29*	13.1	28.5	(23.2) [a]
Yugoslavia	24.2	62.5	*43*	*25*	12.4	28.8	21.9
Turkey	36.7	73.2 *	*50*	*21*	20.0	40.0	(35.9) [a]

NOTE. — Group I covers countries with an employment share in agriculture, in 1965-1967, of 20 per cent or less, and Group II countries with a share of more than 20 per cent. Group II countries have, in the recent past, been net emigration countries.

Hypothesis I assumes that relative output per head in agriculture in 1980 will be the same as in 1965-1967, that is $\text{Col. } 6 = \frac{\text{Col. } 5}{\text{Col. } 3} \times 100$

Hypothesis II assumes that relative output per head in the various countries will move according to the equation reflecting the cross-country pattern, taking together the periods 1953-1955, 1959-1961 and 1965-1967 (employment share = 1.8431 output share — 0.9727; see chart 3.6); this hypothesis is not, however, applied to countries which were already in 1965-1967 below the regression line (for these cases, Hypothesis I is repeated).

[a] Results for countries not included in the equation from which Hypothesis II is derived (Greece and Turkey) are shown in parentheses.

employment—by comparison with past experiences—might affect over-all activity rates and could invalidate a total labour supply projection based on previous trends. This is simply because the age/sex composition of the agricultural labour force is in some countries such (large proportions of old people and working wives) that loss of agricultural employment could mean only complete withdrawal from the labour force. The changes from previous trends implied by our projections, even on Hypothesis II, are hardly large enough to bring this factor into play.

(iv) Growth in the public services

Within the public service sector, certain branches deserve separate consideration. The greater part of this section, (*a*), necessarily deals with the sector as a whole, with some comments on defence expenditure; in (*b*) some tentative estimates are made for civilian output separately and in (*c*) for health and education services.

(a) *Total public services*

It must be emphasized from the outset that the basic data relating to output and employment in public services (as summarized in table 3.26) suffer from many deficiencies. The main difficulty is the familiar one of establishing any meaningful measure of " output at constant prices "—a conceptual difficulty which affects also other services with no clear units of output, but which is rendered still more acute for services not subject to any price or market valuation. The measures of real output adopted in national accounts are necessarily arbitrary, and—which is more important for the

Table 3.25

Expected changes in agricultural employment and labour supply for non-agricultural sectors, 1965 to 1980, compared with past changes

(Annual rates of change)

Country	Past change[a]			Expected change 1965-1967 to 1980				
					In agriculture		In other sectors	
	Total	in agriculture	in other sectors	Total	Hypothesis I	Hypothesis II	Hypothesis I	Hypothesis II
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
United Kingdom	0.6	−2.7	0.7	0.2	−1.0	−1.0	0.2	0.2
Western Germany	1.1	−3.6	2.0	0.0	−2.8	−4.5	0.3	0.4
Switzerland	1.1	−3.9	1.6	0.4	−2.4	−2.4	0.6	0.6
Belgium	0.6	−4.0	0.9	0.4	−2.6	−2.6	0.6	0.6
Sweden	0.6	−4.1	1.5	0.0	−5.2	−6.0	0.5	0.5
Norway	0.3	−2.8	1.2	0.4	−5.1	−7.7	1.3	1.5
Netherlands	1.2	−3.0	1.7	1.0	−2.3	−2.3	1.2	1.2
France	0.3	−3.5	1.3	0.5	−2.4	−2.8	1.0	1.0
Austria	0.4	−3.3	1.7	0.0	−3 0	−4.9	0.6	0.9
Denmark	1.1	−2.5	2.1	0.2	−3.7	−3.7	0.8	0.8
Total Group I				0.3	−2.7	−3.4	0.5	0.6
Italy	0.4	−3.4	2.0	0.7	−2.3	−2.3	1.4	1.4
Finland	1.1	−1.8	2.5	0.5	−2.6	−2.6	1.3	1.3
Spain	0.8	−1.7	2.4	0.9	−3.1	−3.7	2.3	2.5
Portugal	0.2	−2.0	1.7	0.5	−3.9	−4.5	2.1	2.2
Ireland	0.1	−2.6	1.5	1.4	−1.4	−1.4	2.3	2.3
Greece	0.6	−1.3	2.5	0.6	−3.7	−5.2	3.2	3.7
Yugoslavia	0.7	−0.8	4.1	1.1	−4.2	−4.5	6.0	6.7
Turkey	0.9	0.1	3.3	2.8	−1.6	−2.3	8.9	9.4
Total Group II				1.3	−2.6	−3.3	3.3	3.6

NOTE. — See table 3.24.

[a] In general least square trend 1953-1967. For Ireland LST 1958-1967; for Spain 1954-1967; 1960-1967 for Portugal and Switzerland and 1960-1965 for Turkey.

Table 3.26

Output and employment in public services: shares of total economy and trends

Country	Share in total economy in 1963 Per cent		Rates of growth — per cent a year (least square trends 1953-1967)			
	Output	Employment	Output[a]	Employment	Productivity[a]	Elasticity[b]
Austria	12.8	10.1	3.27	2.98	0.28	0.60
Belgium	12.5	12.9	5.01	1.35	3.61	1.40
Denmark	11.5	..	4.68	..	..	1.07
Finland	11.1	9.5	4.53	3.61	0.88	0.95
France	14.8	13.1	3.72	1.39	2.30	0.73
Western Germany	9.4	7.2	4.74	1.86	2.83	0.84
Italy	11.9	8.2	3.37	2.59	0.75	0.60
Netherlands	14.8	14.4	3.88	1.79	2.04	0.77
Norway	11.0	12.2	4.70	2.46	2.18	1.17
Sweden	12.6	14.1	3.74	4.42	−0.65	0.88
United Kingdom	11.0	14.8	0.92	0.86	0.06	0.24

NOTE. — Qualifications on the comparability of these figures are emphasized in the text.

[a] Note particularly the important reservations to these series, as recorded at 1963 prices, discussed in the text.

[b] Ratio of growth of public service output to growth of GDP less public services.

present study—vary widely between countries. In some, the simple total of numbers employed is used as an indicator of real output implying constant output per head. In some, (e.g. the United Kingdom) the numbers employed are, wherever possible, weighted by grades and by sex according to relative pay; thus a change in productivity occurs only because of a change in staff composition (the assumption being constant output per head in each pay grade).[90] In other countries, direct indicators of " output ", or assumptions about productivity increases, may be used. The substantial productivity increases recorded in Belgium and western Germany suggest some such method. For these reasons, differences between countries in the rate of " output " and " productivity " increase in public services are mainly due to differences in methods of measuring real output; the recorded changes in employment may be more significant. However, there are also differences between countries in the range of activities covered by the public service sector. In principle, we have attempted to include the categories health and education, both public and private, as well as public administration and defence.[91] The distinction between private and public health services, in particular, is largely irrelevant to the present type of analysis. It is not important for our purpose whether health services are publicly provided as in the United Kingdom (with or without some specific charges being made), or are privately organized as in France, Italy and the Netherlands and in whole or part financed by transfer payments. In fact, however, the data available, particularly in respect of health and education, do not have the same coverage. Thus the Belgian figures exclude both public and private hospitals; the Italian figures appear to exclude private education (which is small) and health (the greater part of health services); [92] the United Kingdom figures also exclude private education (which is appreciable) and private health services (relatively small). These are only some of the incomparabilities which may affect the results of any international analysis. When national data are compared in detail, other anomalies are found which suggest significant differences in statistical conventions.

Notwithstanding these reservations, it is possible to draw some conclusions about the kinds of trend operating in the public service sector. The procedure must necessarily be to analyse the figures as they are recorded, qualifying the results when they appear to be heavily influenced by statistical incomparabilities. More reliability can often be attached to trends over time in individual countries than to cross-country comparison.

From the data on public service output and employment, summarized in table 3.26, it can be seen that the estimated shares of employment (which include the armed forces) vary between 7-8 per cent in western Germany and Italy and 14-15 per cent in the Netherlands, Sweden and the United Kingdom. There are some signs of a positive correlation between the employment share and the level of income per head if we ignore the very low employment share in western Germany, which is subject to some doubt.[93]

The relations between employment shares and output shares in 1963 (at current prices, and so not affected by the doubts concerning real output measurement) may also be significant. In some countries with relatively high income per head—Norway, Sweden, and the United Kingdom—the employment share of public services in the economy exceeds the output share: output per head—which means essentially labour income per head—is less than that in the rest of the economy. In Austria, Finland, France and Italy, the level of output per head in the public services is above average. The latter countries, as have been noted in the previous section, are countries with high shares of agriculture in the economy and a corresponding low level of agricultural output per head pushing up relative output per head in all non-agricultural sectors.

The growth in public service output as recorded, shown in table 3.26, varied between just over 3 and about 5 per cent a year in 1953-1967; the exception is the United Kingdom with an annual increase of only 1 per cent (the reason being the rundown in defence expenditure in the 1950s). In most countries, (except Belgium, Denmark and Norway) these increases were less than in GDP as a whole. Elasticities against GDP are calculated (table 3.26) against the growth of GDP less public services. Comparison of these elasticities may not appear very meaningful in view of the different methods of measuring public service output, but they serve a purpose in the projections subsequently made. And there is some indication that the elasticities tend to be greatest where the growth rate of output in the economy as a whole is slowest (with the notable exception of the United Kingdom—again largely because the relative defence expenditure was falling). This conclusion—suggesting that public service output served to some modest extent as a long-term stabilizing influence on growth—is supported by a number of analyses for individual countries showing over time the elasticity of growth in public service output against that in the rest of the economy. Out of eleven countries tested, eight showed significant relationships; all except the United Kingdom suggest that the growth of public service output has been rather less in periods of faster

---

[90] Previously, direct " output " indicators such as number of pupils, bed-days in hospital etc. were used in the United Kingdom for measuring health and education services. But these proved unsatisfactory and were given up.

[91] These are the categories for which information is requested in the OECD national accounts questionnaires and are given, so far as available, in the OECD annual " National accounts of OECD countries ".

[92] According to the OECD " National accounts " tables. But similar figures given, for example, in *Relazione generale sulla situazione economica del paese (1967)* appear to include at least public health and education.

[93] The official estimate of employment used here is consistent with that used for other sectors and includes public health and education. But a different set of estimates of employment distribution (from the DIW) yields a considerably higher proportion—about 9½ per cent in 1963 (of which, 1½ per cent in the armed forces).

TABLE 3.27

Shares of public service output in GDP (1963 prices) and of public service employment in total employment

Country	*Share of public service output in total output*			*Share of public service employment in total employment*		
	1953 per cent	*1967 per cent*	*Change in percentage points*	*1953 per cent*	*1967 per cent*	*Change in percentage points*
Austria	16.2	12.3	−3.9	8.1	11.3	+3.2
Belgium	11.1	13.1	+2.0	12.5	14.1	+1.6
Finland	11.8	11.3	−0.5	7.9	10.8	+2.9
France	16.8	14.1	−2.7	11.0	13.3	+2.3
Western Germany	10.6	9.7	−0.9	7.6	8.1	+0.5
Italy	14.6	11.2	−3.4	6.9	9.0	+2.1
Netherlands	15.8	14.4	−1.4	13.5	15.4	+1.9
Norway	10.2	11.0	+0.8	10.0	13.3	+3.3
Sweden	13.1	12.6	−0.5	10.0	17.1	+7.1
United Kingdom	13.8	10.9	−2.9	15.1	16.3	+1.2

growth of GDP.[94] Since output elasticities have been mostly less than unity—which may well be a result of the statistical conventions—the share of recorded public services output in GDP has generally tended to fall (see table 3.27). There is, moreover, a positive correlation between the magnitude of the public service share at the beginning of the period (1953) and the extent of its subsequent decline, indicating a certain degree of convergence.

A better guide to the dynamism of the public service sector may be derived from the changes in public service employment (table 3.26). They show a rather wider range of growth rates than does output; the biggest increase in employment—over 4 per cent a year—was in Sweden, followed by Finland; the smallest was under 1 per cent in the United Kingdom.

Public service employment considerably increased its share of total employment in all the countries reviewed; the elasticity of public service employment to total employment was in all cases well over one (although very little over one in western Germany and the United Kingdom). By far the biggest increase in the share—as in the rate of increase—was in Sweden, from 10 per cent to 17 per cent between 1953 and 1967;[95] the smallest increase, from 7½ to 8 per cent, was in western Germany. Again, it must be remembered that differing coverage of the public service sector may be partly responsible for these differences.

Public output and public expenditure

Direct public service output represents, of course, only a fraction of total general government expenditure—and a fraction varying greatly from country to country. The size of the fraction depends on the relative importance of particular public services (for example, on the size of the armed forces), on the arrangements made for financing, for example, health services (whether by direct provision or by transfer payments) on the relative importance of investment to current expenditure, etc.[96]

A comparison can be made between public service output and public consumption (general government current expenditure on goods and services). Two points may be noted. First, the elasticity of growth of public consumption to GDP (both at constant prices) has most often been below 1—very similar to that of public service output (see table 3.28). If total general government expenditures have risen faster than GDP, the dynamic elements must have been, in most countries, transfer payments and public investment.

Secondly, there are very marked differences between the ratios of public consumption to public service output (also shown in table 3.28). On the whole, higher ratios appear in countries at higher income levels. Thus in Sweden and the United Kingdom public consumption is nearly twice as large as public service output. In Austria, Belgium and France, the two are approximately equal. In part, this can be explained by different compositions of expenditure and differences in financing arrangements; but (as table 3.28 also shows) much the same differences appear when health and education (the services most likely to be affected by differences in financing arrangements) are, wherever possible and rather approximately, excluded.[97] These differences

---

[94] The equations for the eight significant cases (with r at least 0.71) are:

Belgium .... $y = 2.25 - 0.21\,x$
Finland .... $y = 1.79 - 0.17\,x$
France .... $y = 1.48 - 0.14\,x$
Western Germany...... $y = 1.85 - 0.18\,x$
Italy .... $y = 1.01 - 0.07\,x$
Norway .... $y = 2.40 - 0.28\,x$
Sweden .... $y = 1.27 - 0.09\,x$[a]
United Kingdom....... $y = -1.94 + 0.72\,x$

y = elasticity of growth rate of public service output to x
x = growth rate of GDP less public service output.

[a] Included although $r = 0.65$.

[95] Since the recorded output increase was rather small in Sweden, a decline in productivity is implied. This may well be the result of a particularly cautious method of estimating real output in public service. But there may also be differences in coverage between the output and employment figures.

[96] For a detailed analysis of expenditure trends in certain countries, see Frederic L. Pryor " Public expenditure in communist and capitalist countries ".

[97] For methods of excluding health and education, see p. 116.

TABLE 3.28

Relations between public consumption[a] and public service output

Country	Ratio of public consumption to public service output 1965[b]		Elasticity[c] to growth of GDP less public services 1953-1967	
	Including health and education	Excluding health and education	Public consumption	Public service output
Sweden	1.87	3.0	1.01	0.88
United Kingdom	1.84	1.9	0.33	0.24
Netherlands	1.67	—	0.54	0.77
Norway	1.51	2.1	1.13	1.17
Western Germany	1.49	1.2	1.06	0.84
Denmark	1.34	..	0.94	1.07
Finland	1.27	1.8	1.02	0.95
Austria	1.20	0.7	0.50	0.60
Belgium	1.04	1.0	1.25	1.40
France	1.03	..	0.58	0.73
Italy	..	0.8	0.73	0.60
Ireland	..	..	0.59	..

[a] General government current expenditure on goods and services.

[b] At 1963 prices.

[c] Ratio of least square trends; 1963 prices.

represent, essentially, differences in the proportion of inputs from other sectors to public service output. The suggestion is that where the ratio is high—broadly in the higher income countries—the public services require more elaborate inputs in the form of equipment and other outside supplies and, correspondingly, have a greater relative demand impact on other sectors of the economy.

National trends over time in public consumption elasticities to GDP show a rather more systematic pattern than those in public service output. An analysis testing for changes in these elasticities during the period 1953-1967 (summarized in table 3.29) shows a general tendency for elasticities to increase over time (except in Belgium, where it was high at the beginning of the period, and Sweden where it remained high throughout).

TABLE 3.29

Elasticities of growth of public consumption[a] against growth of total GDP (at constant market prices): results of best fitting equations, 1953-1967

Country	Constant elasticities	Changing elasticities	
		1953[b]	1967[b]
Austria	0.50	0.35	0.68
Belgium	1.25	1.41	1.22
Denmark	0.94	0.73	1.21
Finland	1.02	0.73	1.35
France	0.58	0.51	0.65
Western Germany	1.06	0.69	1.54
Ireland	0.59	0.57	0.64
Italy	0.73	0.67	0.79
Netherlands	0.54	0.46	0.60
Norway	1.13	0.89	1.42
Sweden	1.01	1.01	1.00
United Kingdom	0.33	0.30	0.38

Source: equations derived from data in OECD, *National Accounts of OECD countries.*

[a] General government current expenditures on goods and services.

[b] Trend values for 1953 and 1967 derived from equations.

A comment may be made on the share of *defence expenditure* as an item of public consumption.[98] Figures of defence expenditure in 1965 as a share of GDP are given below, countries being ranked in order of GDP per head (at official exchange rates, and 1963 factor cost):

	Per cent defence expenditure to GDP 1965
Sweden	4.4
Switzerland	2.5
Denmark	2.7
France	4.2
Western Germany	4.0
Norway	3.6
United Kingdom	5.9
Belgium	2.9
Finland	1.8
Netherlands	3.8
Austria	1.3
Italy	2.6
Ireland	1.2

Source: OECD, *National Accounts of OECD countries, 1958-1967.*

The point that emerges is that the share of defence expenditure is not related to the level of income per head. But it is related, in a general way, to the size of country. The four big countries—United Kingdom, western Germany, France and Italy—all show high defence expenditures in relation to their place on the income scale. Among the smaller countries, the Netherlands, Sweden and Norway stand out with relatively high shares in relation to incomes.

Projecting public service output

Projections of public service output must necessarily incorporate the statistical incomparabilities which apply to the data for the past. Projections are suggested in terms of elasticities to GDP excluding public services. The results in terms of projected growth rates of output are given below.

Elasticity of growth of public service output to growth of GDP less public services

(1963 prices)

	1953-1967	1965-1967 to 1980
Austria	0.60	0.9
Belgium	1.40	1.3
Denmark	1.07	1.1
Finland	0.95	1.0
France	0.73	0.8
Western Germany	0.84	1.1
Italy	0.60	0.6
Netherlands	0.77	0.9
Norway	1.17	1.0
Sweden	0.88	0.8
United Kingdom	0.24	0.7

It is difficult to justify any precise set of projections for this uncertain area. Taking into account the trends already described, not only in output but also in employment and in public consumption, and their shares in the economy, the following set of elasticities is proposed as a basis for projection:

---

[98] Separate data are not generally available on defence *output* (figures are however given for Belgium).

The tendency noted above for increasing elasticities of public consumption to GDP in most countries is the main factor taken into account, and assumed to extend to the trends in public output. It is however very clear from the preceding analysis that public consumption, and public service output, are not wholly determined by the trends in the rest of the economy; government policies and social needs play an autonomous role, although within constraints set by available resources and tax capacity. Some account is also taken of the distinction between defence and civil output, giving more weight to the trend in civil output as measured by methods to be described below.

(b) *Civilian public service output*

An attempt has been made to estimate separately output and employment in public services *excluding* defence (and including health and education to the extent that they are included in the basic data). Estimates of employment in civilian services have been made directly. Very tentative estimates of civil output have been made for each year by striking an average between two relevant indicators: (*a*) the share of civil public employment in total employment and (*b*) the share of civil consumption in total public consumption.[99]

Elasticities of these estimates of civil output (against growth of GDP less all public services) are shown in table below. They are generally higher than those of total public service output, and are lower only in western Germany (where the building up of defence services was a factor in the high elasticity for total public service output). But most of the elasticities (including that for the United Kingdom which was only 0.2 for total public service output) are close to 1 for civil output.

TABLE 3.30

Elasticities[a] of civil public service output against GDP less public service output

Country	*Total civil public service output* [b]	*Health and education output* [c]
Austria	0.60	0.77
Belgium	1.87	1.64
Finland	..	1.17
France	0.95	1.54
Western Germany	0.62	0.76
Italy	0.75	..
Netherlands	1.04	1.17
Norway	1.55	1.44
Sweden	0.95	1.17
United Kingdom	0.95	1.14

[a] Ratios of least square trends 1953-1967.

[b] For basis of estimates, see text.

[c] Note differences in coverage referred to in text.

An attempt to calculate the elasticity of civil output separately with growth of GDP (less public services) gave negative results in most countries, including all four big countries, but good results in three of the smaller countries—Belgium, Norway and Sweden.[100] This finding contrasts with the correlations reported above between *total* public service output and GDP growth for several large and small countries. It may be that defence is less flexible in the larger countries and that marginal adjustments are therefore more likely to fall on civil output.

The share of civil public employment (as of total public service employment) in total employment has been increasing in all countries, in some countries very considerably.

(c) *Health and education*

Some data on health and education "output" are available for most countries, but not for Denmark, Ireland and Italy. The data for France and western Germany cover *private* health and education only (government services being included in "public administration and defence"); in these two countries, however, this would include the bulk of health services, although not of education.[101] The data for other countries are also subject to some uncertainties as regards their coverage.

For the limited number of countries for which the figures appear to cover effectively the greater part of health and education, the share of these services in GDP is as follows:

	Share of health and education in GDP (factor cost, current prices), 1965 per cent
Finland	7.8
Netherlands	7.6 [a]
Norway	6.7
Sweden	9.2

Source: OECD, *National accounts of OECD countries, 1958-1967.*

[a] Excluding private education.

Note. — The corresponding estimates for the percentage share of health and education in total employment, for the four countries quoted above, are: Finland 5.9, Netherlands 6.2, Norway 7.1, Sweden 8.6; significance cannot be attached to the differences from the output proportions, because of possible differences in coverage. It may be added that for the United Kingdom the proportion of education and health services output, excluding private services, is about 4 per cent of GDP which might be increased to something over 5 per cent if private services were included; but the proportion of total employment in educational and medical and dental services is distinctly higher — about 7 per cent.

The growth rates of output in the health and education services, as defined in the national statistics, are related to growth of GDP (less public services) in table 3.30

---

[99] The validity of this method has been tested for Belgium, for which separate figures are given of civil output and defence output (INS, *Etudes Statistiques*, 1968, No. 19, p. 9). Our method in this case overstates civil output by about 2 per cent.

[100] The equations are:

y = elasticity of growth rate of civil output to x.

x = growth rate of GDP less public services.

		r
Belgium	$y = 4.40 - 0.83\,x$	0.95
Norway	$y = 4.04 - 0.70\,x$	0.94
Sweden	$y = 3.08 - 0.42\,x$	0.69

[101] The United Kingdom figures exclude private health and education, and the Netherlands private education, but these exclusions may be of less significance in these countries.

for nine countries. Except for Austria[102] and western Germany, the elasticities are well over 1; they are mostly higher than the elasticities for total civilian public output (shown in the same table); they are very much higher than the corresponding elasticities for total public service output (table 3.26)—most markedly in the United Kingdom—everywhere except in western Germany (where the expansion of the armed forces pushed up the elasticity for total public service output.)

From the limited and uncertain data available, the conclusion emerges that the growth of the health and education services, in relation to the over-all growth of the economy, has been the most dynamic element in the public-service sector.

---

[102] The exceptionally slow growth of these services in Austria suggests that the figures are not in fact comprehensive.

3.4 SPECIAL FEATURES OF STRUCTURAL DEVELOPMENT IN SOUTHERN EUROPE[103]

Many reasons call for a more pragmatic approach to the analysis of economic trends and prospects in southern Europe than that adopted for the industrial countries. Among these, the following are the most compelling:

(*a*) The analysis of industrial countries treated manufacturing industry as essentially the motor impelling the growth of the whole economy. This cannot apply with the same force to the southern countries. It is true that manufacturing has played, and continues to play, a strategic role of the utmost significance. But that role must be qualified by the importance of agriculture as an independent determinant of the rate, and pattern, of economic development. Thus in the middle 1950s, the agricultural sector accounted for a quarter to a half of total GDP (25-30 per cent in Greece, Portugal and Spain; 40-45 per cent in Turkey and Yugoslavia)[104] a larger share than manufacturing in all five countries although not much larger, even then, in Portugal and Spain. It is true that by 1965-1967, the manufacturing sector dominated agriculture, in terms of contribution to GDP, in Portugal, Spain and Yugoslavia, and in Greece was almost as large as the agricultural sector. (Indeed, by 1965-1967, manufacturing, as a proportion of GDP, was not much less, except in Greece, than in the industrial western countries.) But agriculture continued in 1965-1967 to account for nearly 20 per cent up to 25 per cent of GDP in Greece, Portugal, Spain and Yugoslavia and for a much larger proportion in Turkey. The agricultural shares of total employment were still greater.

(*b*) Although labour supply for expanding branches has in some cases been a constraint in southern Europe, in general labour reserves continue to be ample; an important part of the increase in over-all productivity can be traced to the absorption of manpower by other sectors from agriculture.

(*c*) The incidence of structural weakness in the balance of payments, although not peculiar to the southern countries, has in some cases been particularly detrimental to development. Since the southern countries rely largely on imports of capital goods, scarcity of foreign exchange has impeded the assimilation of modern equipment and modern technology.

(*d*) Linked with the balance of payments problem is the difficulty of obtaining a sufficient level of total savings,[105] either national or external. In this respect, as in others, the southern European countries (except Turkey) stand in an intermediate position between the industrial western countries and the developing countries outside Europe.

(*e*) The southern European countries are undergoing a process of intense structural change, in which economic policies have played perhaps a larger part than in the more settled industrial economies. Moreover there are big differences within this group of countries. Taking into account, also, the incomplete and often rather uncertain statistical data available, and the variations in the nature and rate of development at different times during the past 15 years, the application of uniform methods of analysis becomes particularly hazardous. As will be seen below, a certain process of convergence towards the standard pattern of western industrial Europe is, in some cases, noticeable. But the fluidity of the inter-sectoral relationships in the past, and their dependence on policy in the future, imply much wider margins of uncertainty in analysis and projection.

General features of development in south European countries

All the south European countries except Turkey have shown growth rates of GDP per head of population considerably above those prevailing in most west European countries. The per capita income gap between both groups of countries has thus considerably narrowed; the convergence is still more noticeable if " adjusted " per capita GDP levels are used instead of exchange rate data.[106] But slow output growth in Turkey, combined with the high rates of growth of population, imply that the per capita gap between this country and the others has widened considerably. By contrast, the relative position of Yugoslavia, in terms of income per head, has risen the most.

---

[103] This section covers Greece, Spain, Portugal, Turkey and Yugoslavia.

[104] For statistics on sectoral shares of output and employment see tables 3.31 and 3.32.

[105] The only country which seems at a certain stage to have faced the opposite problem was Yugoslavia, where savings exceeded the absorption level of the economy. See " Incomes in post-war Europe: A study of policies, growth and distribution ", *Economic Survey of Europe in 1965*, Part 2, Geneva 1967, chapter 12, page 26.

[106] See tables 3.1 and 3.5.

The rates of growth of GDP volume have been:

	Per cent a year (least squares trend 1953-1967)
Yugoslavia	8.3 (gross material product)
Greece	5.8
Spain	5.9 (1954-1967)
Portugal	5.1
Turkey	4.4

These variations in over-all rates of growth depend on the relative weight and dynamism of the different sectors, which are examined below.

The rates of growth of manufacturing output show the greatest similarity—particularly for the three countries with the highest income per head (Greece, Portugal and Spain), where manufacturing output has increased by 8-9 per cent a year. The wider differences in growth rates of GDP among these three countries are due mainly to differences in their growth rates for other sectors. It may be significant that in all three countries—all within about the same " adjusted " GDP per head range (see table 3.1)—manufacturing output developed at a rate of just over 8 per cent irrespective of the relative weight in employment and output of other major sectors of the economy. The higher rate of growth of manufacturing in Yugoslavia—at a distinctly lower income level—was accompanied by a rate of growth of employment in manufacturing well in excess of those for other south European countries. In fact, labour productivity in this sector in Yugoslavia increased less than in other south European countries.[107] Thus while the over-all labour productivity of the three richer countries (Greece, Portugal and Spain) grew at a rate close to 5 per cent, that for Yugoslavia was some 2.5 percentage points higher; this is largely the result of the very different pattern of increase in sectoral labour productivity in Yugoslavia, which has benefited from high increases in labour productivity in construction and non-material services and—as far as this concept is valid—from a rapid increase in agricultural labour productivity.

Among the higher income countries, Greece started the period with the most unfavourable output composition having the biggest agricultural, and the smallest industrial, shares of output; but Greece was able to reach a total output growth similar to that of Spain thanks mainly to the fast rate of development of public utilities, construction, transport and trade. The lower rate of growth of total output in Portugal is mostly the result of the virtual stagnation of agricultural output and the relatively low rates of development of transport and trade. Consequently, it appears that in Greece, in spite of rapid growth, output structures changed relatively little from the beginning to the end of the period[108] while in Portugal output shares have changed greatly because expansion was concentrated in the industrial sector. Spain, as it appears from the table below, has evolved an intermediate way, while in Yugoslavia the deep changes in output shares are associated with a very intense process of industrialization. The indicators of structural change for Turkey resemble, with a less violent change, those for Yugoslavia, particularly in respect of the rising share of services and the declining share of construction. However, while the greatest contribution to the increase in output in Yugoslavia arose in the industrial sector, in Turkey it centred on the services sectors, which seem to have absorbed at low productivity levels part of the high surplus of agricultural labour which could not find employment in industry.

The scarce data available on employment show that for all south European countries, the structural changes in output in agriculture and industry are reflected in changes in the relative shares of employment moving in each case in the same direction as output shares but with less intensity (i.e. the share of agricultural employment in total employment declines proportionally less than the output share). An important and striking exception is Yugoslavia, where the employment share in industry doubled while the output share increased only by half. While the relative structural changes in the distribution of employment between agriculture and industry have been less than the relative changes in the shares of output, in construction and other sectors the opposite has been the general rule.

South European countries have, in general, shown a greater instability in their economic growth than the majority of western countries. The greatest degree of instability[109] is shown by Yugoslavia followed by Turkey and Spain, while fluctuations in total output have been much less pronounced in Greece and particularly in Portugal. No general pattern is noticeable (during the period under analysis) in the evolution of the growth of total output in these countries, but a rising trend is apparent in the 1960s in Portugal, Greece and Turkey and also (though less certainly because of wider short-term fluctuations) in Spain, and a declining trend in Yugoslavia probably due to the influence of the reforms of 1965 in economic organization.

Agriculture

By 1967, agriculture held only half to two-thirds of the share in the southern countries' total products which it had held in 1953. As can be seen from the table below, the change in the output share was considerably greater in Yugoslavia and Portugal than in the other countries. But in Yugoslavia this structural development coincided with a substantial increase in agricultural output, while in Portugal agricultural output increased very little (only 1 per cent a year). In Spain and Greece, agricultural output developed at very similar rates (3 per cent); in Spain the reduction in the agricultural labour force was very rapid (particularly in the 1960s) but the scarce indicators available for Greece point to a much more moderate rate of decline in agricultural employment. These differences are partly the result of the different

---

[107] The reason for the relatively low increase of productivity of manufacturing in Yugoslavia was the character of the investment effort in this field which was more of a widening than of a deepening kind. See United Nations, *Some factors in economic growth in Europe during the 1950s*, chapter III, page 19.

[108] Greece continues to have in terms of total output shares the largest agricultural, and the smallest industrial, sector.

[109] As measured by mean deviations of annual growth rates.

Sectoral patterns of growth 1953-1967

	Greece	*Portugal*	*Spain*[a]	*Turkey*	*Yugoslavia*[b]
A. *Growth rates of GDP* (least square trends)					
Agriculture	3.1	0.9	3.0	2.5	3.6
Industry[c]	8.3	8.1	8.3	5.8	11.4
Construction	10.8	8.9	6.8	3.7	8.2
Rest of economy	5.7	4.9	5.2	6.3	8.2
Total economy	5.8	5.1	5.9	4.4	8.3
B. *Percentage contribution of sectors to the increment in total output between 1953 and 1967*					
Agriculture	14.1	3.6	10.2	16.9	13.6
Industry[c]	25.8	51.7	42.9	26.3	49.9
Construction	9.9	9.4	6.2	5.2	6.5
Rest of economy	48.4	35.3	38.5	51.6	25.8
Statistical discrepancy	1.8	—	2.2	—	4.2
Total	100.0	100.0	100.0	100.0	100.0
C. *Ratio of output shares in* 1967 *to those of* 1953 (1953 = 1.00)					
Agriculture	0.70	0.56	0.69	0.71	0.55
Industry[c]	1.43	1.55	1.33	1.35	1.50
Construction	1.74	1.68	1.12	0.91	0.82
Rest of economy	1.01	0.95	0.97	1.34	1.40[d]
Total	1.00	1.00	1.00	1.00	1.00

[a] 1954-1967.
[b] Gross material product.
[c] Manufacturing, mining, public utilities.
[d] Estimation.

rates of growth of employment opportunities in other sectors, but are also much influenced by the structure of land property and the relative weight of labour-intensive crops in individual countries. Thus, the relatively slow reduction of the agricultural employment share in Greece may in part be associated with the more equal land distribution, as well as with the greater relative importance of some labour-intensive crops (tobacco, cotton). Similarly, agricultural labour productivity is influenced by the regional distribution of employment and the labour intensity of the crop patterns in the areas for which emigration has been greatest. Thus the acceleration of emigration from Portugal during the 1960s—when the emigration rate was the highest in western Europe—is associated with a marked acceleration in agricultural productivity; agricultural policy changes are now reinforcing this improvement in productivity.

Two general problems beset the south European countries with different intensity: the adaptation of output structure to changing demand patterns, both domestic and foreign; and the creation of sufficient employment opportunities to absorb agricultural labour and thus to allow an improvement in relative productivity in agriculture and an approach towards agricultural income levels comparable with those in other sectors. The first problem is becoming particularly acute in Spain, Greece and Yugoslavia. The second is felt everywhere—most strongly in Turkey. In pages 110-111 of this chapter, we envisaged (under Hypothesis II) agricultural projections implying an approach towards greater sectoral equality in productivity and incomes. As implied by the discussion in that section, realisation of this hypothesis in the southern countries depends essentially on the rates of growth of employment in the rest of the economy.

The OECD output projections for southern countries (used in pages 105 ff.) contain an important normative element insofar as they assume the successful adoption or reinforcement of particular agricultural policies. The incorporation of modern technical methods of production has, in general, accelerated in recent years and there is no reason to expect a future reversal of this favourable trend. In some countries (particularly Portugal, Spain and Turkey) further improvement depends increasingly on more decided action towards structural weaknesses[110] (land distribution and tenure, land consolidation, co-operation, etc.). Progress has so far been limited. The slowing down in output growth implied by the projections for Greece, Spain and Yugoslavia appears to reflect the change in the emphasis of policies from quantitative towards qualitative targets, aimed at obtaining a better market balance. Improvement in the stability and balance of agriculture depends particularly on raising the low share of animal production and in the improvement of technical methods—more so than on general stimulation of total output.

Industry

The rate of growth of industrial output as a whole in south European countries has been very similar in

---

[110] OECD, *Agricultural Policy Reports: Agricultural Development in Southern Europe.*

Greece, Portugal and Spain, considerably faster in Yugoslavia but slow in Turkey. The greatest increases in output shares took place in Portugal and Yugoslavia, and in these countries too, we find that the industrial sector contributed the most to the growth of total output (see text-table above). At the end of the period (1967) the two Iberian countries had similar shares of output originating in the industrial sector (over one-third of the total) and also in the contribution of the industrial sector to total employment (over one-fourth). The differences in the other south European countries at the end of the period are striking. Thus, while the shares of industrial employment in Yugoslavia and Greece are roughly the same (just under one-fifth of the total), the output share of industry in Yugoslavia is more than twice that for Greece. This is associated with the much greater share (both for employment and output) of the service sector in Greece, with the lower share of agricultural employment in Greece and (following the usual pattern) with the smaller difference in Greece between the labour productivity of the agricultural sector and that of the economy as a whole.[111] Conversely, in Turkey the industrial sector accounted, at the end of the period, for a fifth of total output (as in Greece) while it employed less than one-tenth of the labour force, a result due not only to the narrowness of the industrial sector but also to the important share within it of capital-intensive extractive activities, particularly crude oil.

The variations in industrial expansion during the past 15 years differ considerably from country to country but—with the sole exception of Yugoslavia—there has been a noticeable tendency towards an acceleration since the late 1950s. In Greece the high rates of growth of manufacturing output in the mid-1950s were influenced by fuller utilization of existing capacity while the new peak of the early 1960s was the result of new investments particularly under the influence of a foreign capital inflow. In Spain, the transition from a closed and heavily controlled economy to a system in which market forces were released and trade liberalized—with the help of fast-rising tourist income and the inflow of emigrant remittances—has provoked a structural change to which the economy has not yet become fully adapted. In the early years of the 1961-1966 boom it seems safe to assume that a part of the increase in industrial production was due to the fuller use of capacities, but later the sector reaped the benefits of the general re-equipment undertaken since 1960. In Portugal the increase in the average rate of growth of manufacturing after 1960 has been due to rising investment (partly under the influence of a greater inflow of foreign capital) prompted by a somewhat more vigorous policy of industrialization. The slowing down in Yugoslavia during part of the 1960s was essentially temporary. It was provoked by the economic reform introduced in 1965 with the aim of switching growth from what was in a large measure import substitution to a pattern which should rely to a large degree on export promotion. At the same time, domestic price relatives were aligned to those on the world market, the currency was devalued and a unitary exchange rate was introduced. The immediate effect of these measures on manufacturing was an increase in its costs, while at the same time its protection was cut down by half, imports being considerably liberalized. Moreover, the Government pursued restrictive credit policies with the aim of achieving stability and preserving price relatives and the purchasing power of domestic currency. Under these conditions the rate of growth of industry was bound to decline, but high rates of growth were resumed in 1969. In Turkey the acceleration during the 1960s seems to have been due to a better co-ordinated development effort and somewhat greater availabilities of foreign exchange; a slowing down of industrial expansion in the late 1950s had been due mostly to balance-of-payments difficulties after a period of slack investment.

Projections for manufacturing output

The trends described provide some basis for tentative output projections for the southern countries, although, for reasons already given, it is inappropriate to follow precisely the standard methods adopted (in section 2 (iii)) for industrial western countries. The projected rates of growth proposed may, however, be compared with those which would emerge from the use of the standard method.

Projections for manufacturing growth 1965-1967 to 1980:

(Per cent a year)

	Standard method [a]	*" Current trend "* [a]	*Proposed projection*
Greece	7.9	8.0	9.5
Portugal	9.5	8.2	8.5
Spain	9.0	10.1	8.5
Yugoslavia	10.2	10.0	10.0

[a] See table 3.5.

For Yugoslavia and Spain,[112] the differences from the standard method are not significant. For Greece an acceleration may be justified by the speeding-up of manufacturing growth in recent years and the planning authorities foresee a strong development effort. For Portugal, however, the standard method suggests too drastic an acceleration from past trends to be plausible, and the selected growth rates appear to be in accordance with present medium-term plans.

Other sectors

The development of utilities, construction, transport, trade and other services, taken together, has in all these countries been faster than that of agriculture and industry. This is particularly noticeable in Greece under the influence of very high rates of growth in public utilities and construction, which have played also a similar, although less striking, role in other countries. The rates of growth of the service sectors, except for Portugal, have tended to converge with the rate of growth for manufacturing and, therefore, for the economy as a whole; the difference in Portugal is mainly due to the slow growth of the trade sector. In terms of employment, the shares of the sectors other than agriculture and manufacturing have tended to increase, and to approach more closely those in the industrial western countries.

---

[111] It is pointed out above that the labour productivity of agriculture approaches that for the economy as a whole as income levels increase and the agricultural employment share declines.

[112] The higher " current trend " in the 1960s occurred under temporary conditions of strong demand pressure.

3.5 THE OUTPUT AND EMPLOYMENT STRUCTURE OF THE ECONOMY AS A WHOLE: TRENDS AND PROJECTIONS

(i) Trends in sector shares of output and employment

The discussion of growth rates by sectors, of their relationships to each other and to the level of income per head, and of trends in productivity, can now be summarized by examining the international pattern of sectoral shares in total output and employment.

Cross-country analysis of the percentage shares in output and employment of the three major sectors of the economy—agriculture, manufacturing and the " rest of the economy "—in relation to the level of income per head, yields a reasonably systematic pattern.[113] Of nine forms of equation tried, the best-fitting was of the form $y = a + \frac{b}{x}$ (y being the percentage share of each sector in GDP or total employment, and x the level of GDP per head). The data used relate to the western countries for which figures are available, and the calculations were made for three periods—1953-1955, 1959-1961 and 1965-1967. (See table below.)

A clear pattern emerges from the cross-country comparison.[114] As we move up the income scale, the share of agriculture in total output naturally falls (although only

		Shares in output	r	σ	Shares in employment	r	σ
Agriculture	1953-1955	$y = 5.74 + \frac{6\,327.25}{x}$	0.916	4.83	$y = 11.82 + \frac{9\,604.33}{x}$	0.868	8.65
	1959-1961	$y = 4.55 + \frac{7\,375.43}{x}$	0.917	4.40	$y = 6.40 + \frac{13\,498.8}{x}$	0.869	8.25
	1965-1967	$y = 3.84 + \frac{7\,541.30}{x}$	0.908	3.75	$y = 2.05 + \frac{17\,706.1}{x}$	0.858	7.91
Manufacturing	1953-1955	$y = 28.68 + \frac{1\,584.21}{x}$	0.474	4.58	$y = 30.97 - \frac{3\,325.38}{x}$	0.747	4.65
	1959-1961	$y = 29.39 - \frac{872.64}{x}$	0.181	5.09	$y = 31.79 - \frac{3\,929.76}{x}$	0.632	5.16
	1965-1967	$y = 30.64 + \frac{309.45}{x}$	0.043	5.30	$y = 31.91 - \frac{4\,261.66}{x}$	0.547	4.86
Rest of the economy	1953-1955	$y = 64.95 - \frac{4\,263.86}{x}$	0.845	4.20	$y = 57.21 - \frac{6\,278.86}{x}$	0.845	6.24
	1959-1961	$y = 66.03 - \frac{6\,470.05}{x}$	0.847	4.36	$y = 61.81 - \frac{9\,568.76}{x}$	0.857	6.17
	1965-1967	$y = 65.66 - \frac{8\,012.64}{x}$	0.829	4.02	$y = 66.05 - \frac{13\,444.1}{x}$	0.846	6.31

y = percentage of each sector to total GDP or total employment;

x = GDP per head, 1963 factor cost, in \$US at official exchange rates.

Countries covered: industrial western European; southern Europe; Canada, Japan and United States.

---

[113] Attempts to find similar systematic relationships to the level of income per head for the individual non-agricultural non-manufacturing sectors discussed above—mining, utilities, construction, transport, trade, miscellaneous services, public services—were not productive (except for the trade sector).

[114] A rather similar analysis of sector shares in output and employment is made in chapter 2 (Appendix table 2.V and chart 2), covering a wider range of market economies and income levels, for comparison with the sector shares in centrally planned economies. It should be noted, however, that for the special purpose of the analysis in chapter 2, " adjusted " GDP per head is used and the sectors are differently defined.

slowly at income levels of $1,500 or more) and the weight shifts to the " rest of the economy "; but the manufacturing share of output, although rising over the lowest income levels, appears to be constant at income levels above $750 a head. (Italy, Ireland, the southern European countries and Japan were below this level in 1953-1955; and only southern countries and Japan in 1965-1967.) It must be noted, however, that the equations given above showed no correlation of the manufacturing share of output with income per head; the national variations from the average manufacturing share in output—just under 30 per cent in 1953-1955, and just over 30 per cent in 1965-1967—appear to be unconnected with income level.[115]

The distribution of employment between the three sectors follows the same kind of pattern, with some evidence of a rising share for manufacturing as income per head rises at least up $1,500. The differences between the sector shares in output and employment, respectively, are of course governed by inter-sectoral differences in output per head of which more is said below.

The schematic pattern just outlined may be presented in round figures as follows (taking the equations for 1965-1967):

	Shares of output			*Shares of employment*		
GDP per head ($)	*Agriculture*	*Manufacturing* [a]	*Rest*	*Agriculture*	*Manufacturing*	*Rest*
500	19	31	50	38	23	39
1 000	11	30	59	20	27	53
1 500	9	31	60	14	29	57
2 000	8	31	61	11	30	59
2 500	7	31	62	9	30	61

[a] Taken as residual, for reason given above.

From the size of the standard errors of estimate in the equations above, it is, however, to be expected that some large national divergences will be found from the standard cross-country pattern. The sector shares for each country, (with the residuals from the equation for 1965-1967) are shown in table 3.31 for output and in table 3.32 for employment.

Among the biggest divergences in 1965-1967, in relation to income levels—reflected in both output and employment—are (*a*) the high shares of agriculture in Finland (because of the importance of forestry) and in Ireland (offset by low shares of manufacturing); (*b*) the low shares of agriculture in the United Kingdom and in Portugal (offset in both cases by high shares in the two other sectors) (*c*) the high share of manufacturing in western Germany (the biggest share—40 per cent of output and 38 per cent of employment—in any country, offset chiefly by low shares for the " rest of the economy ").

Some other large divergences appear in the employment shares, but are not reflected in output shares. Thus in relation to their income levels Belgium and the Netherlands both show low shares of agricultural employment but not of output, indicating relatively high output per head. On the other hand, Yugoslavia shows an extremely high share of agricultural employment (at over 60 per cent, the highest for any country shown) but a normal share for agricultural output in relation to the income level.

It must also be pointed out that the trends over time in individual countries are not entirely in accordance with what one might be led to expect from the cross-country equations. In particular, the cross-country equations suggested, above a fairly low income level, approximate constancy in the manufacturing share of output and only a slow rise in its share of employment. In fact, most countries, at all income levels, show an increase over time in the manufacturing share of both output and employment (though more marked for output than for employment: see tables 3.31 and 3.32. One reason for the difference appears to be the special features of developments in the United States and Canada. In both countries, the manufacturing shares of output and employment are considerably smaller than in most western European industrial countries—the difference being more marked for employment than for output (as the result of high output per head relatively to other sectors). And in the United States and Canada, unlike western Europe, the manufacturing shares have changed very little over time.[116]

One reason for the lower share of manufacturing output in the United States as compared with most west European countries is the lesser dependence of United States manufacturing industry on an export surplus. With a level of manufacturing production considerably greater than that of western Europe, the United States currently has significantly less exports of manufactures than western Europe and slightly larger imports (for this comparison, the relevant figure for western Europe is the region's exports to, or imports from, the rest of the world, excluding intra-trade). Moreover, while the United States export surplus in manufactures has changed little since the mid-1950s ($5½ billion in 1955 and $5 billion in 1965-1967), western Europe's export surplus has considerably increased ($8½ billion in 1955 to $12½ billion in 1965-1967) and has kept pace with the rise in manufacturing output. Another factor is the lower ratio of investment in the United States; the relevant figure is investment in machinery and equipment, which has about the same value (at official exchange rates) in the United States as in the whole of western Europe. So long as these differences in foreign trade performance and investment behaviour persist, it cannot be expected that the manufacturing share of output in western Europe will follow the American pattern.

---

[115] There is good evidence of lower manufacturing shares in the lower-income countries in 1953-1955 to justify the upward slope given at low income levels. See table 3.31. There is also evidence from time series that in most countries at higher income levels, the manufacturing share for output at constant prices should rise over time (see below).

[116] In the United States, the share of manufacturing in total employment shows only slight variations from just before World War I (before which it was rising) up to recent years, apart from periods of war and the 1929-1932 depression. But there are signs, as in table 3.32, of a declining tendency since the early 1950s. See data in US Department of Commerce, *Long-term Economic Growth 1860-1965*, Washington 1966.

TABLE 3.31

Output shares of sectors in GDP

Actual shares in total economy and residuals from equations relating shares to income levels [a]

Country	Agriculture				Manufacturing				Rest of economy			
	Actual values, Per cent				Actual values, Per cent				Actual values, Per cent			
	1953-55	1959-61	1965-67	Residuals [b] 1965-67	1953-55	1959-61	1965-67	Residuals [b] 1965-67	1953-55	1959-61	1965-67	Residuals [b] 1965-67
Austria	14.5	11.4	9.1	−1.8	32.6	35.8	36.5	5.6	52.9	52.8	54.4	−3.8
Belgium	8.4	7.9	5.9	−3.0	27.0	28.6	31.9	1.0	64.6	63.5	62.2	2.0
Denmark	15.9	13.8	11.3	2.9	26.8	28.6	30.3	−0.5	57.3	57.6	58.4	−2.4
Finland	22.9	20.7	16.5	7.3	23.8	24.7	27.1	−3.8	53.3	54.6	56.4	−3.6
France	12.3	10.6	9.0	0.6	28.7	30.4	31.0	0.2	59.0	59.0	60.0	−0.8
Western Germany	8.3	6.6	5.5	−3.1	34.3	37.6	39.7	8.9	57.4	55.8	54.8	−5.8
Ireland	22.7	23.7	19.8	5.8	20.3	22.9	26.9	−4.2	57.0	53.4	53.3	−1.6
Italy	19.1	16.2	13.5	1.5	22.6	26.3	30.2	−0.8	58.3	57.5	56.3	−0.7
Netherlands	11.6	10.3	8.7	−1.1	27.7	28.7	31.3	0.4	60.7	61.0	60.0	0.7
Norway	13.6	10.8	7.8	−0.7	25.1	26.0	27.4	−3.4	61.3	63.2	64.8	4.1
Sweden	10.2	8.3	6.5	−0.8	28.9	30.1	35.1	4.3	60.9	61.6	58.4	−3.6
United Kingdom	3.7	3.6	3.6	−5.2	32.9	33.9	34.7	3.9	63.4	62.5	61.7	1.3
Canada	9.5	7.1	6.6	−0.8	25.4	24.9	27.0	−3.8	65.1	68.0	66.4	4.5
Japan	21.8	16.3	10.6	..	19.4	26.7	31.6	..	58.8	57.0	57.8	..
United States	4.3	3.9	3.2	−3.0	28.8	27.3	29.4	−1.3	66.9	68.8	67.4	4.2
Greece	31.8	27.7	23.2	6.4	13.3	15.5	17.1	−14.1	54.9	56.8	59.7	7.9
Portugal	30.6	24.3	18.5	−6.2	24.0	29.0	34.5	3.0	45.4	46.7	47.0	3.5
Spain	24.4	23.9	17.7	0.8	22.4	25.5	29.9	−1.3	53.2	50.6	52.4	0.6
Yugoslavia	41.0	33.3	24.2	0.7	25.4	31.6	37.4	5.9	33.6	35.1	38.4	−6.4
Turkey	46.6	42.9	36.8	−0.4	..	..	..	..	..	..	..	..

NOTE. — The equation for agriculture was based on twenty observations, whereas the equations for manufacturing and the rest of the economy were based on nineteen observations (excluding Turkey). This is why the residuals in the three sectors for each country do not cancel out completely.

[a] Equations: Y = share of economy

X = GDP per head (1963 factor costs), official exchange rates

Agriculture: $Y = 3.84 + \frac{7541.30}{X}$

Manufacturing: $Y = 30.64 + \frac{309.45}{X}$

Rest of economy: $Y = 65.66 - \frac{8012.64}{X}$

[b] Actual less calculated values.

Similar reasons may well explain the differences between manufacturing shares among west European countries. Thus the very high share in western Germany is associated with a particularly large export surplus in manufactures.

(ii) Relative output and wages per person employed

Data on relative output per person employed, at current factor cost (for short, " productivity ") in different sectors are brought together in table 3.33, for the year 1963. Productivity, so derived, is simply the sum of labour income, self-employers' incomes, and gross trading profits of corporate enterprises, divided by the number of persons engaged whether as wage or salary earners or as self-employers. It is not necessarily to be taken as an index of " efficiency ". For comparison, estimates are also made in the table for wages and salaries per wage and salary earner (including wherever possible employer's contributions to social security, superannuation schemes etc. which are regarded in national accounts as part of labour income).[117] It will be realized that although labour income is the largest part of factor cost, relative labour incomes often differ from relative productivities; such differences may be

---

[117] Wages and salaries per worker represent in principle the total labour income in the year, divided by the average number of persons employed. The figures are not necessarily equal to average pay for a normal full week or month since the proportion of part-time, short-time, overtime workers etc will vary.

TABLE 3.32

Shares of sectors in employment

Actual shares in total employment and residuals from equations relating shares to income levels [a]

Country	Agriculture: Actual values 1953-55	Agriculture: Actual values 1959-61	Agriculture: Actual values 1965-67	Agriculture: Residuals [b] 1965-67	Manufacturing: Actual values 1953-55	Manufacturing: Actual values 1959-61	Manufacturing: Actual values 1965-67	Manufacturing: Residuals [b] 1965-67	Rest of economy: Actual values 1953-55	Rest of economy: Actual values 19 59-61	Rest of economy: Actual values 1965-67	Rest of economy: Residuals [b] 1965-67
	Per cent				Per cent				Per cent			
Austria	31.8	24.3	20.2	1.6	28.8	31.2	31.1	3.2	39.4	44.5	48.7	−4.8
Belgium	9.3	7.4	5.3	−8.7	32.8	33.5	33.5	4.5	57.9	59.1	61.2	4.3
Denmark	25.4	21.1	16.6	3.8	28.5	30.3	32.7	3.4	46.1	48.6	50.7	−7.2
Finland	36.6	31.8	25.8	11.3	21.9	22.5	23.5	−5.4	41.5	45.7	50.7	−5.9
France	25.9	20.7	16.2	3.4	27.0	27.7	28.3	−1.0	47.1	51.6	55.5	−2.4
Western Germany	18.9	13.8	10.7	−2.5	34.1	37.0	37.6	8.4	47.0	49.2	51.7	−5.9
Ireland	38.8	36.9	31.1	5.2	15.1	16.3	18.6	−7.6	46.1	46.8	50.3	2.3
Italy	35.7	29.4	22.8	1.6	24.7	26.9	29.0	1.7	39.6	43.7	48.2	−3.3
Netherlands	13.7	11.1	8.3	−7.7	29.2	29.6	29.1	0.6	57.1	59.3	62.6	7.1
Norway	26.3	22.3	18.1	5.1	24.0	23.9	25.2	−4.1	49.7	53.8	56.7	−1.0
Sweden	20.2	15.8	11.2	1.0	30.1	31.2	30.9	1.0	49.7	53.0	57.9	−1.9
United Kingdom	4.8	4.2	3.2	−10.5	35.3	35.9	35.1	6.0	59.9	59.9	61.7	4.5
Canada	18.3	13.1	9.3	−1.0	24.2	23.5	23.6	−6.3	57.5	63.4	67.1	7.3
Japan	41.1	32.4	23.4	..	18.5	21.5	24.9	..	40.4	46.1	51.7	..
United States	9.2	7.3	5.2	−2.3	27.1	25.9	26.1	−4.5	63.7	66.8	68.7	6.8
Greece	..	..	..	..	..	..	..	..	..	..	..	..
Portugal	45.3	42.0	34.9	−16.1	20.6	21.7	24.7	4.6	34.1	36.3	40.4	11.5
Spain	45.2	41.5	34.2	1.4	20.1	22.3	24.4	−0.1	34.7	36.2	41.4	−1.3
Yugoslavia	74.1	67.0	62.5	14.3	8.9	13.4	16.6	−4.2	17.0	19.6	20.9	−10.1
Turkey	..	..	.	..	..	.	..	.	..			

[a] Equations: Y = share of total employment
X = GDP per head (1963 factor costs), official exchange rates

Agriculture: $Y = 2.05 + \frac{17,706.1}{X}$

Manufacturing: $Y = 31.91 - \frac{4,261.66}{X}$

Rest of economy: $Y = 66.05 - \frac{13,444.1}{X}$

[b] Actual less calculated values.

due to differences in the value of capital per worker, or to differences in the rate of return on capital, (or to differences in the proportion of self-employers whose incomes contain elements of labour income and return on capital).[118] All figures are expressed as ratios of average productivity or labour income in manufacturing industry.

No systematic analysis of the determinants of relative productivity levels has been attempted.[119] The equations given on page 121 above, showing shares of output and employment in relation to the level of income per head, might indeed be thought to imply a systematic relationship between income per head and relative productivities. But the marked national deviations from these equations appear too numerous to justify a combination of the equations even as a standard of comparison. Thus only a few general comments will be made on table 3.33. The data may be useful for assessing the effects of inter-sectoral shifts on total productivity in the economy—bearing in mind, of course, that such shifts are likely to influence the relative sectoral productivities and labour incomes.

Broadly speaking, four sectors generally show lower productivities than manufacturing. These are agriculture, construction, trade and miscellaneous services (the latter especially when income from " ownership of dwellings " is excluded). They also show lower levels of wages and salaries per worker, except for construction. Three sectors generally show higher productivities, and also higher wages and salaries than manufacturing—mining, public utilities and transport and communications. In the public service sector, recorded output per worker is sometimes above and sometimes below that in manufacturing, but labour income is nearly

---

[118] For a fuller account, see an earlier ECE study, " Incomes in post-war Europe: A study of policies, growth and distribution ". *Economic Survey of Europe in 1965*, Part 2, Geneva 1967, especially chapter 2.

[119] More detailed material about relative productivities in agriculture was given on p. 97.

TABLE 3.33

Output at current factor cost per person employed, and wage and salary bill per wage and salary earner, by sector, 1963

(Percentages; manufacturing = 100)

Country	Agriculture [a]	Mining	Manufacturing	Public utilities	Construction	Transport and Communications	Trade	Miscellaneous services including ownership of dwellings	Miscellaneous services excluding ownership of dwellings	Public services	Total economy	Total excluding manufacturing and agriculture
A. Output per person employed												
Austria	41.4	198.2	100	310.2	129.6	99.6	83.7	70.9	63.8	111.7	87.8	101.6
Belgium	120.2	100.5	100	271.9	93.1	117.6	100.0	143.3	95.1	108.4	111.4	117.0
Finland	55.8	159.5	100	300.1	82.5	90.9	82.3	142.3	70.4	103.2	88.7	103.2
France	48.1	165.2	100	280.1	84.2	105.1	123.5	83.0	57.4	103.7	92.0	102.9
Western Germany	50.0	125.0	100	300.0	100.0	116.7	100.0	100.0	75.0	133.3	100.0	108.3
Ireland	44.8	107.3	100	193.3	..	66.9	66.9	78.0	61.5	101.2 [b]	70.9	78.7
Italy	56.8	100.6	100	414.9	73.9	141.5	88.1	167.7	110.8	142.6	98.8	120.0
Netherlands	89.5	124.0	100	260.4	67.4	121.7	92.2	93.8	69.1	99.7	97.1	96.8
Norway	39.1	145.1	100	284.2	92.9	148.3	103.2	101.0	72.0	84.2	93.0	109.6
Sweden	49.0	195.4	100	303.0	102.1	100.1	81.2	143.4	98.0	83.4	93.7	101.0
United Kingdom	102.1	104.5	100	201.9	95.8	127.1	89.6	138.7	107.3	77.1	103.9	106.2
Portugal	44.3	57.3	100	385.8	52.0	112.4	125.0	79.2	54.7	114.9	76.9	95.6
Yugoslavia	19.0	137.7	100	213.3	74.6	95.7	100.9	37.1 [c]	30.6	..	44.1	79.7
Canada	58.7	356.9	100	259.1	75.8	101.0	61.3	93.7 [c]	93.0	114.9	92.2	95.3
United States	50.0	200.0	100	240.0	70.0	120.0	80.0	90.0	60.0	90.0	90.0	90.0
Japan	37.5	200.0	100	..	..	..	..	..	..	..	83.8	102.6
B. Wage and salary bill per wage- and salary-earner												
Belgium	69.7	107.5	100	184.0	81.3	130.7	106.7		100.7	..	..	..
Finland	89.4	111.4	100	123.6	116.5	100.5	83.5		87.9	133.0	101.9	104.8
France	43.4	115.5 [c]	100	135.4 [d]	79.8	132.8	102.1		87.4	131.4	102.6	109.5
Western Germany	72.1	118.7	100	125.1	101.7	105.1	83.3		85.2	128.8	99.1	99.5
Italy	39.4	94.6	100	263.7	64.2	170.1	88.5		108.9	170.7	101.9	116.9
Netherlands	101.1	137.1	100	131.2	85.8	119.5	83.2		79.8	123.1	100.3	100.5
Norway	86.9	110.1	100	129.5	118.3	124.0	89.8		78.4	115.9	102.7	104.9
Sweden	94.4	98.1	100	106.8	124.0	112.5	108.1		87.5	165.0	104.3	107.8
United Kingdom	87.9	119.5	100	130.8	117.8	131.7	91.3		129.1	113.0	109.1	115.6
United States	27.9	105.1	100	115.7	99.1	111.1	81.6		74.3	79.4	86.5	83.7

[a] Includes forestry and fishing.
[b] Excluding health and education.
[c] Including public services.
[d] Not fully comparable with the other sectors.

always greater (the figures for this sector are particularly dubious, partly because of the possibilities of differences in coverage of the output and employment figures). To these generalisations, however, there are many exceptions apparent in the table.

For *agriculture*, it has already been shown on p. 104 that relative productivity tends to increase as the share of agriculture falls (and as income per head rises). Thus only Belgium and the United Kingdom show levels of productivity close to (in Belgium above) that in manufacturing; in the Netherlands, however, the difference is relatively small. These relationships are not at all exactly reproduced by the pattern of relative wages and salaries; but in most countries, wage and salary earners constitute only about 10-20 per cent of the agricultural labour force (except for the United Kingdom, where they are about half).

In *construction*, the generally low level of productivity[120] presumably reflects the low degree of capital intensity. Relative wages and salaries are high in the Nordic countries and the United Kingdom but are particularly low in France and Italy.

---

[120] The high figure for Austria suggests a lack of statistical comparability.

In the *trade sector*, a high level of productivity relatively to manufacturing is shown only in France[121] and Portugal. Wages and salaries are also less than in manufacturing in most countries, but not in Belgium, France or Sweden.

Miscellaneous services (excluding " ownership of dwellings ") is in most countries the sector with the lowest recorded productivity outside agriculture, and either this sector or the trade sector generally shows the lowest wage/salary level (a reflection, probably, of the high proportion of women employed). The exceptions, both for productivity and for wages, are the United Kingdom and Italy (but in Italy miscellaneous services include medical services).

Public utilities (in which electricity generation and distribution predominate) is the sector with by far the highest figure of productivity (except in Canada, where mining leads), by virtue of its high degree of capital intensity.[122] Output per worker is generally three times or more as much as in manufacturing. The high relative productivities are associated with high—although not so high—relative wage/salaries (except in Sweden).

Although relative productivity in *mining* is usually high, there are big differences between countries, depending on the type of mining—and, perhaps more important, on its profit record. Thus the relatively low figures of output per worker in Belgium and the United Kingdom may reflect the low profits. On the other hand, wages in mining are above those in manufacturing except in Italy and Sweden (although not much above in Belgium). They are very little above in the United States, but this may be associated with the very high level of manufacturing wages in the United States relatively to all other sectors.

Transport and communications also shows high relative productivity and high relative wages in most countries, although less so than public utilities.

If productivity in manufacturing is compared with all the other non-agricultural sectors taken together, we find an approximate equality in most countries (see last column of table 3.33);[123] there is indeed some tendency for the other sectors together slightly to exceed manufacturing. The same applies to the comparison of wages and salaries. There are, however, exceptions. Belgium and Italy both show higher productivity (and Italy higher wages) in the non-manufacturing group. Norway and the United Kingdom show, though less strikingly, the same exceptional pattern—essentially higher wages and/or higher profits per worker for the average of those sectors which are, for the most part, less subject than manufacturing to international competition. By contrast, we find relatively high levels of manufacturing productivity and wages in the United States (and of productivity in Canada) compared with the rest of the economy.

(iii) Projections of output and employment for the whole economy to 1980

We can now bring together the results of the discussion above in order to formulate a set of projections for the western European economies.[124] The projections cover the period to 1980, taking the average of the years 1965-1967 as the starting point. The character of these projections, and the way in which they should be assessed, was suggested in chapter I.

Output projections

The output projections rest on the following foundations:

(*a*) For *manufacturing*, a combination of current trend with the results of an equation correlating manufacturing output growth with the level of income per head. (See page 70) and the actual projections in table 3.5; for south European countries see page 120.

(*b*) For *agriculture*, basically the OECD projections, converted to added values.

(*c*) For other sectors, we use mainly elasticities against manufacturing growth—see page 89 (for the public service sector, against GDP less these services—see page 115). However different methods of deriving elasticities—cross-country and national time series—yield different results and some compromise must be adopted.

For two sectors—*mining* and *miscellaneous services*—no correlation was found between output growth and other variables. We therefore simply extrapolate, for the projections, the trend growth rates of output found for the period 1953-1967.[125]

For public utilities, construction, transport and communication, and trade, there are two sets of elasticities against manufacturing growth to choose between. The elasticities derived from the 1953-1967 period, and the projected future elasticities implied by each, are shown in table 3.34. These are:

A. Elasticities derived from *national time series* (ratio of growth of sector to manufacturing growth, taking least square trends for 1953-1967). These are labelled A in table 3.34.

B. Elasticities derived from *cross-country* equations relating growth rates in each sector to that in manufacturing. These are labelled B in table 3.34. The elasticity for each sector thus varies with the rate

---

[121] As pointed out on page 95 above, the French value added figure for trade includes import duties; but even when corrected for this element, the productivity is distinctly high.

[122] The ratio of annual gross fixed investment to added value is in most countries 1: 2 and in some 1:1. The highest productivity can be found where the more capital-intensive hydroelectric systems of power generation prevail.

[123] This comparison may be more valid than those for individual sectors since there is much less risk of incomparabilities of coverage in output and employment figures.

[124] We have not here attempted over-all projection for the United States, Canada and Japan, although, for comparison, projections of manufacturing growth in these countries were made in section 3.3 (i).

[125] An exception was made for miscellaneous services in western Germany, where the " current trend " (4.7 per cent a year) is projected instead of the 1953-1967 trend (5.3 per cent a year) in harmony with the projection of manufacturing growth at a lower rate than the 1953-1967 trend (see page 97).

TABLE 3.34

Elasticities in respect of past and projected growth rates for manufacturing

(A. Country elasticities based on least square trend 1953 to 1967)

(B. Elasticities derived from cross-country equations)

	Manufacturing growth rates		*Elasticities in respect of growth rates in manufacturing*							
			Public utilities		*Construction*		*Transport*		*Trade*	
	1953-1967	*Projected*	*Past*	*Projected*	*Past*	*Projected*	*Past*	*Projected*	*Past*	*Projected*
Austria										
Growth rates	5.99	5.0								
Elasticities										
A			1.37	1.37	1.00	1.00	0.97	0.97	1.33	1.33
B			1.30	1.39	0.81	0.82	0.81	0.83	0.85	0.89
Belgium										
Growth rates	5.27	5.2								
Elasticities										
A			1.15	1.15	0.65	0.65	0.70	0.70	0.64	0.64
B			1.36	1.37	0.82	0.82	0.83	0.83	0.87	0.88
Denmark										
Growth rates	5.57	5.1								
Elasticities										
A			1.40	1.40	1.01	1.01	0.80	0.80	0.97	0.97
B			1.33	1.38	0.81	0.82	0.82	0.83	0.86	0.88
Finland										
Growth rates	5.95	5.6								
Elasticities										
A			1.35	1.35	0.66	0.66	0.87	0.87	1.00	1.00
B			1.30	1.33	0.81	0.81	0.81	0.82	0.85	0.86
France										
Growth rates	5.49	5.2								
Elasticities										
A			1.60	1.60	1.23	1.23	0.96	0.96	1.09	1.09
B			1.34	1.37	0.82	0.82	0.82	0.83	0.86	0.88
Western Germany										
Growth rates	6.79	5.2								
Elasticities										
A			0.91	0.91	0.77	0.77	0.65	0.65	0.93	0.93
B			1.24	1.37	0.80	0.82	0.80	0.83	0.83	0.88
Ireland										
Growth rates	5.07	6.3								
Elasticities										
A			1.50	1.50	0.20	0.20	..	..	..	..
B			1.38	1.27	0.82	0.81	0.83	0.80	0.88	0.84
Italy										
Growth rates	7.95	6.9								
Elasticities										
A			1.10	1.10	0.62	0.62	0.80	0.80	0.74	0.74
B			1.19	1.24	0.79	0.80	0.78	0.79	0.83	0.83
Netherlands										
Growth rates	5.90	5.6								
Elasticities										
A			1.10	1.10	1.18	1.18	0.80	0.80	0.88	0.88
B			1.31	1.33	0.81	0.81	0.81	0.82	0.85	0.86
Norway										
Growth rates	4.83	5.0								
Elasticities										
A			1.51	1.51	0.40	0.40	1.44	1.44	0.92	0.92
B			1.40	1.38	0.83	0.82	0.84	0.83	0.90	0.88
Sweden										
Growth rates	6.04	5.1								
Elasticities										
A			1.18	1.18	0.72	0.72	0.59	0.59	0.85	0.85
B			1.29	1.38	0.81	0.82	0.81	0.83	0.84	0.88

TABLE 3.34 (*continued*)

	Manufacturing growth rates		*Elasticities in respect of growth rates in manufacturing*							
			Public utilities		*Construction*		*Transport*		*Trade*	
	1953-1967	*Projected*	*Past*	*Projected*	*Past*	*Projected*	*Past*	*Projected*	*Past*	*Projected*
United Kingdom										
Growth rates	3.23	4.0								
Elasticities										
A			1.66	1.66	1.07	1.07	0.75	0.75	0.87	0.87
B			1.68	1.50	0.87	0.84	0.92	0.87	1.08	0.96
Greece										
Growth rates	7.99	9.5								
Elasticities										
A			1.56	1.56	1.35	1.35	0.99	0.99	0.91	0.91
B			1.18	1.13	0.79	0.78	0.78	0.77	0.83	0.85
Portugal										
Growth rates	8.24	8.5								
Elasticities										
A			1.23	1.23	1.08	1.08	0.59	0.59	0.56	0.56
B			1.17	1.16	0.79	0.79	0.78	0.77	0.83	0.83
Spain [a]										
Growth rates	8.74	8.5								
Elasticities										
A			0.99	0.99	0.78	0.78	0.70	0.70	0.49	0.49
B			1.16	1.16	0.79	0.79	0.77	0.77	0.84	0.85
Yugoslavia										
Growth rates	11.70	10.0								
Elasticities										
A			1.16	1.16	0.70	0.70	0.80	0.80	0.83	0.83
B			1.08	1.12	0.77	0.78	0.75	0.76	0.93	0.87

NOTE. — "Past" = 1953-1967. [a] 1954-1967 for "Past".

of manufacturing growth and the appropriate elasticity can be applied to the projected growth rate of manufacturing.[126]

A compromise has been arrived at between A, representing national experience, and B, representing a common international pattern.[127] In effect, we assume a *partial* convergence towards the cross-country pattern. The resulting elasticities, and the resulting rates of growth of the various sectors, are shown in table 3.35. For Ireland and the southern European countries the methods had to be adapted slightly because of the incompleteness of the sectoral data (see table 3.35).

These elasticities, and the changes in them, express inter-sectoral growth relationships which must be regarded as the net result of a multiplicity of different dynamic factors. The principal element is the changing pattern of domestic expenditure, shifting over time, and as incomes rise, between different kinds of goods and services. But other factors enter: changes in the balance and pattern of foreign trade; changes in input-output relationships which may be technological in origin (increasing demand for power) or the result of increasing complexity of industrial life (additional requirements, say, for financial services); or changing importance of publicly provided services such as health, education, or military defence. To sum up these diverse, and possibly conflicting, elements into a few elasticities—compromising, as we have done, between, on the one hand, an underlying international pattern related more or less closely to income levels and, on the other, the somewhat different trends in individual countries even at similar income levels—is necessarily uncertain. The process clearly allows little room for the unexpected,

---

[126] A third set of elasticities was calculated (not shown) based upon national time-series (taking five-year moving averages). But significant correlations were not found in all cases, and the results may still be subject to cyclical influences.

[127] The compromise elasticity is derived as follows (taking public utilities in Austria, as shown in table 3.34, as an example):

(*a*) The elasticity (A) derived from the national time series (1.37) is assumed to change proportionally in the future in accordance with the cross-country elasticity B (from 1.30 to 1.39) for the change in the growth rate of manufacturing (from 5.99 in the past to 5.0 in future). This gives a projected elasticity [illegible] $\frac{1.39}{1.30}$.

(*b*) This result (1.46) is then averaged with the elasticity calculated from the cross-country equation (1.39) for the projected manufacturing growth rate. The average is the elasticity used for the projection of sectoral output (1.42 = mean of 1.46 and 1.39). Applied to the manufacturing growth rate (5.0), this gives the sectoral output growth (7.1 = 1.42 × 5.0).

Other ways of compromising between national experience and the cross-country pattern could obviously be adopted, but the results would not differ greatly.

TABLE 3.35

Projected rates of output growth [a] based on average between national and inter-country elasticities [b]

Past : 1953 to 1967; projections : 1965-1967 to 1980

	Agriculture		*Mining*		*Manufacturing*		*Public utilities*		*Construction*		*Transport*		*Trade*		*Miscellaneous services*		*Public services*		*Total economy*	
	Past	*Pro-jected*	*Past*	*Pro-jected*	*Past*	*Pro-jected*	*Past*	*Pro-jected*	*Past*	*Pro-jected*	*Past*	*Pro-jected*	*Past*	*Pro-jected*	*Past*	*Pro-jected*	*Past*	*Pro-jected*	*Past*	*Pro-jected*
Austria																				
R.G.	1.58	1.5	−1.08	−1.1	5.99	5.0	8.19	7.1	6.01	4.6	5.81	4.6	7.99	5.7	5.36	5.4	3.27	4.3	5.12	4.7
El.							1.37	1.42	1.00	0.92	0.97	0.91	1.33	1.14	0.90		0.60	0.9	0.86	(0.94)
Belgium																				
R.G.	1.01	0.9	−3.39	−3.4	5.27	5.2	6.04	6.6	3.43	3.8	3.70	4.0	3.39	4.0	2.72	2.7	5.01	5.2	3.74	4.2
El.							1.15	1.27	0.65	0.74	0.70	0.77	0.64	0.77	0.52		1.40	1.3	0.71	(0.80)
Denmark																				
R.G.	1.29	0.2	−2.56	−2.6	5.57	5.1	7.82	7.2	5.62	4.7	4.47	4.2	5.38	4.8	3.13	3.1	4.68	4.6	4.41	4.3
El.							1.40	1.42	1.01	0.92	0.80	0.82	0.97	0.94	0.56		1.07	1.1	0.79	(0.84)
Finland																				
R.G.	2.12	1.4	6.05	6.1	5.95	5.6	8.05	7.6	3.92	4.1	5.20	4.8	5.93	5.2	4.90	4.9	4.53	4.7	4.76	4.7
El.							1.35	1.36	0.66	0.74	0.87	0.85	1.00	0.94	0.82		0.95	1.0	0.80	(0.83)
France [f]																				
R.G.	2.49	1.6	2.43	2.4	5.49	5.2	8.80	7.8	6.74	5.3	5.30	4.7	5.98	5.2	4.16	4.2	3.72	3.8	4.89	4.6
El.							1.60	1.51	1.23	1.03	0.96	0.90	1.09	1.00	0.76		0.73	0.8	0.89	(0.88)
Western Germany																				
R.G.	2.20	1.4	1.00	1.0	6.79	5.2	6.20	6.2	5.23	4.2	4.40	3.9	6.32	4.9	5.34	4.7	4.74	5.1	5.52	4.6
El.							0.91	1.19	0.77	0.81	0.65	0.75	0.93	0.94	0.79		0.85	1.1	0.81	(0.89)
Ireland																				
R.G.	1.23	1.8	7.94	7.9	5.07	6.3	←	—	—	—	—	—	1.75	5.0	—	—	—	→	2.47	4.9
El.							←	—	—	—	—	—	0.35	0.8	—	—	—	→	0.49	(0.78)
Italy																				
R.G.	2.19	2.1	5.35	5.4	7.95	6.9	8.72	8.2	4.96	4.9	6.39	5.5	5.91	5.4	4.44	4.4	3.37	3.3	5.29	5.3
El.							1.10	1.2	0.62	0.72	0.80	0.80	0.74	0.79	0.56		0.60	0.6	0.67	(0.76)

TABLE 3.35 (*Continued*)

	Agriculture		*Mining*		*Manufacturing*		*Public utilities*		*Construction*		*Transport*		*Trade*		*Miscellaneous services*		*Public services*		*Total economy*	
	Past	*Projected*	*Past*	*Projected*	*Past*	*Projected*	*Past*	*Projected*	*Past*	*Projected*	*Past*	*Projected*	*Past*	*Projected*	*Past*	*Projected*	*Past*	*Projected*	*Past*	*Projected*
Netherlands																				
R.G.	2.49	1.2	0.77	0.8	5.9	5.6	6.37	6.9	6.82	5.6	4.67	4.6	5.08	4.9	3.34	3.3	3.88	4.2	4.77	4.6
El.							1.10	1.2	1.18	1.00	0.80	0.82	0.88	0.88	0.58		0.78	0.9	0.82	(0.83)
Norway																				
R.G.	−1.11	−1.3	3.98	4.0	4.83	5.0	7.31	7.3	1.95	3.1	6.93	5.7	4.42	4.5	3.36	3.4	4.70	4.5	4.09	4.5
El.							1.51	1.4	0.40	0.61	1.44	1.13	0.92	0.89	0.70		1.17	1.0	0.85	(0.88)
Sweden																				
R.G.	0.38	−0.9	4.34	4.3	6.04	5.1	7.15	6.7	4.34	4.0	3.59	3.6	5.14	4.5	3.82	3.8	3.74	3.5	4.20	4.2
El.							1.18	1.32	0.72	0.78	0.59	0.72	0.85	0.89	0.63		0.88	0.8	0.69	(0.83)
United Kingdom																				
R.G.	2.56	2.4	−1.54	−1.5	3.23	4.0	5.37	6.1	3.47	3.8	2.41	3.2	2.81	3.5	3.43	3.4	0.92	2.6	2.77	3.6
El.							1.66	1.49	1.07	0.94	0.75	0.79	0.87	0.87	1.06		0.30	0.7	0.86	(0.88)
Greece																				
R.G.	3.10	2.6	8.01	8.0	7.99	9.5	12.44	12.4	10.75	10.0	7.88	8.3	7.25	8.5	5.51	4.8 [c]	3.43	.. [c]	5.83	6.9
El.							1.56	1.31	1.35	1.06	0.99	0.88	0.91	0.89	0.69		0.56		0.73	(0.72)
Portugal																				
R.G.	0.89	1.7	−1.24	−1.2	8.24	8.5	10.10	10.1	8.87	7.9	4.90	5.7	4.59	5.9	3.87	5.3 [c]	6.88	.. [c]	5.13	6.5
El.							1.23	1.19	1.08	0.94	0.59	0.68	0.56	0.70	0.47		1.38		0.62	(0.76)
Spain [d]																				
R.G.	2.99	2.2	1.68	1.7	8.74	8.5	8.69	9.1	6.78	6.7	6.10	6.2	4.26	5.6	6.51	5.6 [c]	3.10	.. [c]	5.92	6.3
El.							0.99	1.08	0.78	0.79	0.70	0.74	0.49	0.66	0.74		0.50		0.68	(0.75)
Yugoslavia																				
R.G.	3.61	2.7	7.52	7.5	11.70	10.0	13.62	11.6	8.15	7.5	9.31	7.9	9.74	8.3	4.62 [c]	4.6 [c]	.. [c]	.. [c]	8.30	7.8 [e]
El.							1.16	1.16	0.70	0.75	0.80	0.79	0.83	0.83	0.39 [c]		.. [c]		0.71	(0.78)

---

[a] Projections derived from elasticities when projected elasticities shown. Agriculture: see section 3.3. Other sectors: when no projected elasticities shown, the projected output is an extrapolation of 1953-1967 trend of output.

[b] Elasticities to manufacturing, except for public services (elasticities to gross domestic product less public services) *Past*: ratio to national least-square trends of output (A in table 3.34). *Projected*: " compromise " estimate between national data and cross-country equations as explained in the test. *Elasticities for total economy* (in brackets): are those implied by the sum of sectoral growth rates in relation to manufacturing.

[c] Public services are included in " Miscellaneous services ".

[d] 1954-1967 for " Past ".

[e] Material product.

[f] All statistics based on figures published before 1968 revision of national accounts. SNA concepts. The revision, which has been carried back only to 1962, added more than 0.5 per cent a year to the estimated growth rate in 1962 to 1967.

but it is at least derived from a wide range of recorded experience, from which certain underlying uniformities can be distilled.

GDP projections

We now have, in the final column of table 3.35, projections of GDP growth rates from 1965-1967 to 1980.[128] In most countries, the effect of adding the non-manufacturing sectors is to moderate somewhat the change from the past trend projected for manufacturing alone. This is true of the projected slowing down of growth in Austria, Denmark, Finland, western Germany and Yugoslavia. For some countries, the projected decline in manufacturing growth is associated with a constant rate of growth of GDP (Italy, Sweden) or even with some acceleration of GDP growth (Belgium, Spain). But in France and the Netherlands, the result is a similar slowing down in both manufacturing and GDP.

Again, where manufacturing growth is projected to accelerate, the addition of non-manufacturing sectors moderates the speeding up of manufacturing growth in Greece, and adds to the acceleration of manufacturing growth in Ireland, and Portugal, while allowing about an equal acceleration in Norway and the United Kingdom.

The final result is a certain acceleration in GDP growth rates, compared with the trend over the whole period 1953-1967, in seven countries: Belgium, Ireland,[129] Norway,[129] United Kingdom, Greece, Portugal and Spain; approximate continuance of the past trend in two (Italy and Sweden); and a slowing down in the remaining seven countries. Of the twelve industrial countries, however, GDP growth rates are projected to fall or remain unchanged in all except Belgium, Ireland, Norway and the United Kingdom.

The projected average growth rates of GDP in western Europe compare with the past trend as follows:

	1953-1967 [a]	*Projected* [a] *1965-1967 to 1980*
	Per cent a year	
Industrial countries [b]	4.5	4.5
Southern Europe [b] .	6.3	6.8
Total western Europe [a]	4.6	4.7

[a] 1963 output values at official exchange rates extrapolated by trend growth rates and aggregated.

[b] Excluding Switzerland and Turkey respectively.

Productivity and employment projections

We have already established, by cross-country equations, relationships between growth rates of output and growth of productivity for manufacturing industry (see page 84 and tables 3.2 and 3.11) and for the non-agricultural non-manufacturing sectors taken as a single group (see page 86 and table 3.11).[130] These relationships between output and productivity appear more satisfactory than those between output and employment and will therefore be used as one element in deriving employment projections (in preference to using the direct relationships between output and employment growth). For agriculture we have derived productivity and employment projections on two alternative hypotheses (see page 110).[131]

However, the assumption of convergence to a common international pattern of relationships between output and productivity growth is implausible as the sole basis for projection. As has been done for other elements in the projections, a compromise is adopted between extrapolation of national experience and the cross-country pattern, separately for manufacturing and for non-agricultural non-manufacturing sectors as a single group.[132] A part of each country's divergence from the cross-country pattern in productivity growth is preserved, but allowance is also made for differences of the projected from the past output growth.

The resulting projections for productivity and employment are given in table 3.36 (retaining the two alternative hypotheses for agricultural productivity and employment).

The manpower balance—industrial countries

It remains to see how far these projections of GDP can be reconciled with reasonable projections of manpower supply.

In table 3.37, we confront (*a*) the projections of employment implied by the output and productivity projections with (*b*) projections of manpower supply previously made by the secretariat;[133] the projections shown—one of several variants—are mainly authoritative national projections; the important assumptions behind them are first, no net migration, in or out, and, secondly, no substantial change in the trend of specific activity rates. This confrontation of what might be termed labour demand and supply projections is done only for the industrial countries.

In most of the industrial countries, the result of the confrontation is a *prima facie* excess of projected labour demand over projected supply.[134] The main reason is not a projected slowing down in productivity growth,

---

[128] Also summarized in chapter 1.

[129] Countries in which the " current trend " in manufacturing (and probably in GDP), as defined in table 3.5, is above the trend over the whole period 1953-1967.

[130] The relationships found for non-agricultural non-manufacturing as a whole are more satisfactory than the rather diverse relationships between output and productivity found for the individual sectors.

[131] Hypothesis I assumed that output per worker in agriculture relatively to that in the rest of the economy would remain constant (implying a minimum outflow from agriculture). Hypothesis II assumed for most countries an improvement in relative productivity in agriculture and a greater outflow.

[132] As for the sectoral elasticities above, the form of compromise adopted is to take for each country the mean of (*a*) the national productivity growth rate in 1953-1967 adjusted by use of the cross-country equation for the change from the past to the projected growth rate of output; and (*b*) the actual growth of productivity in each country in 1953-1967.

[133] See " Determinants of Labour Supply in Europe " published as chapter III of *Economic Survey of Europe in 1968*, especially tables 25 and (for alternative hypotheses for industrial countries) table 27; " Variant II " is referred to in the present text. Some of the figures have been slightly revised from more recent information.

[134] For the significance of the apparent excess demand for labour in Italy, see page 135.

TABLE 3.36

Productivity and employment projections: industrial countries; 1965-1967 to 1980

Country	*Agriculture*			*Manufacturing*			*Rest of economy*			*Total economy*		
		Projected [a]			*Projected* [b]			*Projected* [b]			*Projected* [c] *with agricultural Hypothesis*	
	Past	*Hypothesis I*	*Hypothesis II*	*Past*	*A*	*B*	*Past*	*A*	*B*	*Past*	*I*	*II*
Austria												
Productivity	5.0	4.6	6.7	4.9	4.1	4.2	3.1	2.7	2.8	4.7	3.8	4.0
Employment	−3.3	−3.0	−4.9	1.0	0.9	0.8	2.2	2.1	2.1	0.4	0.9	0.6
Belgium												
Productivity	5.2	3.6	3.6	4.5	4.2	4.3	2.3	2.1	2.4	3.1	3.1	3.1
Employment	−3.9	−2.6	−2.6	0.7	1.0	0.8	1.0	1.7	1.4	0.6	1.1	1.1
Denmark												
Productivity	3.9	4.0	4.0	3.1	4.1	3.5	2.6	2.4	2.5	3.2	3.2	3.2
Employment	−2.5	−3.7	−3.7	2.4	0.9	1.5	1.9	1.9	1.9	1.1	1.1	1.1
Finland												
Productivity	4.0	4.1	4.1	4.1	4.4	4.2	2.3	2.8	2.5	3.6	3.5	3.5
Employment	−1.8	−2.6	−2.6	1.8	1.1	1.4	2.8	2.1	2.4	1.1	1.1	1.1
France												
Productivity	6.2	4.1	4.5	4.7	4.2	4.3	3.4	2.6	2.8	4.6	3.7	3.7
Employment	−3.5	−2.4	−2.8	0.7	1.0	0.8	1.6	2.0	1.8	0.3	0.9	0.9
Western Germany												
Productivity	6.0	4.3	6.2	4.8	4.2	4.0	3.0	2.6	2.6	4.3	3.3	3.4
Employment	−3.6	−2.8	−4.5	1.9	1.0	1.1	2.0	2.0	1.9	1.1	1.2	1.1
Ireland												
Productivity	3.8	3.3	3.3	4.1	4.8	4.4	2.2	2.8	3.1	3.1	3.9	3.9
Employment	−2.5	−1.4	−1.4	2.3	1.4	1.8	1.2	2.1	1.8	−0.6	1.0	1.0
Italy												
Productivity	5.8	4.5	4.5	6.0	5.2	5.3	2.8	2.7	2.8	4.9	4.1	4.1
Employment	−3.4	−2.3	−2.3	1.8	1.6	1.5	2.1	2.1	2.1	0.4	1.1	1.1
Netherlands												
Productivity	5.6	3.6	3.6	4.6	4.4	4.4	2.7	2.5	2.5	3.5	3.2	3.2
Employment	−3.0	−2.3	−2.3	1.2	1.1	1.1	2.0	1.9	1.9	1.2	1.4	1.4
Norway												
Productivity	1.7	4.0	6.9	4.0	4.1	4.2	3.2	2.6	2.9	3.7	3.8	4.0
Employment	−2.8	−5.1	−7.7	0.8	0.9	0.9	1.5	2.0	1.8	0.3	0.7	0.5
Sweden												
Productivity	4.7	4.7	5.6	5.1	4.1	4.3	1.8	2.2	2.1	3.5	3.2	3.2
Employment	−4.1	−5.2	−6.0	0.9	0.9	0.8	1.9	1.8	1.9	0.6	1.0	1.0
United Kingdom												
Productivity	5.4	2.6	2.6	2.7	3.5	3.3	1.7	1.8	2.1	2.2	2.6	2.6
Employment	−2.7	−1.0	−1.0	0.5	0.6	0.7	0.8	1.5	1.2	0.6	1.0	1.0

[a] Productivity and employment projections derived from alternative assumptions in tables 3.24 and 3.25.

[b] Productivity projections as explained in text (page 131) and employment derived therefrom.
A: Productivity based on cross-country relationships.
B: Compromise between A and national past trend.

[c] Derived by aggregating the B projections for " Manufacturing " and " Rest of economy "

but the projected slowing down in the growth of the labour force. This in turn is partly because of natural demographic causes, but in some countries mainly because these projections make no allowance for any net migration in future. Small differences need not be treated as evidence of a constraint on the projected growth rates; there are too many uncertainties in the calculations both of projected labour " demand " and of projected " supply ".[135] But for some countries the gap appears significant. These are Austria, Belgium Denmark, Finland, western Germany, Sweden and the United Kingdom. How far need these apparent gaps be regarded as serious constraints on the projected growth rates of total output ? It will be seen (table 3.37) that the calculated gaps in these countries are equivalent to between just under 10 per cent and just over 15 per cent of the projected labour force in 1980 (or between about ½ per cent and 1 per cent a year).

There are several ways in which the gaps might be partly or wholly filled, if desired, without affecting the output projections.

---

[135] The differences between the two hypotheses about employment in agriculture are very small in relation to total labour force.

TABLE 3.37

Confrontation of labour demand with projected supply; industrial countries, 1965/67 to 1980

Country	Change in the labour supply [a]		Change in labour " demand "						Projected labour force in 1980			Estimated shortage (—) or surplus (+) of manpower as per cent of labour supply in 1980		
			A [b] Hypothesis I for agriculture		B [b] Hypothesis II for agriculture		C [c]			of which: agriculture				
	Thousands	Annual rate	Thousands	Annual rate	Thousands	Annual rate	Thousands	Annual rate	Total	Hypothesis I	Hypothesis II	A [b]	B [b]	C [c]
Austria	13	0.0	418	0.9	313	0.6	−5	−0.0	3 285	430	325	−12.3	−9.1	+0.5
Belgium	229	0.4	591	1.1	591	1.1	544	1.0	3 939	134	134	−9.2	−9.2	−8.0
Denmark	58	0.2	370	1.1	370	1.1	334	1.0	2 336	224	224	−13.4	−13.4	−11.8
Finland	139	0.5	339	1.1	339	1.1	306	1.0	2 120	352	352	−9.4	−9.4	−7.9
France	1 572	0.5	2 816	0.9	2 686	0.9	26	0.0	21 654	2 317	2 187	−5.7	−5.1	+7.1
Western Germany	164	0.0	4 988	1.2	4 583	1.1	996	0.3	26 007	1 917	1 512	−18.5	−17.0	−3.2
Ireland	221	1.4	152	1.0	152	1.0	301	1.8	1 287	272	272	+5.4	+5.4	−6.2
Italy	1 927	0.7	3 045	1.1	3 045	1.1	998	0.4	20 208	3 011	3 011	−5.5	−5.5	+4.6
Netherlands	674	1.0	971	1.4	971	1.4	704	1.0	5 193	270	270	−5.7	−5.7	−0.6
Norway	105	0.5	150	0.7	107	0.5	164	0.7	1 637	133	90	−2.7	−0.1	−3.6
Sweden	3	0.0	519	1.0	499	1.0	330	0.7	3 420	181	161	−15.1	−14.5	−9.5
United Kingdom	771	0.2	3 846	1.0	3 846	1.0	5 435	1.4	26 480	715	715	−11.6	−11.6	−17.6

[a] Derived from *Economic Survey of Europe in 1968*, chapter III, table 25, taking " Variant II ". Projected per cent increases in total labour force applies to employment in 1965-1967.

[b] Employment projection consistent with output and productivity projections (estimate B from table 3.36).

[c] Assuming over-all productivity increase to be at the same rate as in 1953-1967.

First, and most obviously, the projected productivity growth rates might be faster than we have projected. The effect on labour demand of continuing the past trend of productivity growth is shown in table 3.37 (column C). For most countries, the projected over-all productivity growth is very close to the past trend. There are however three important exceptions among the countries showing a labour shortage. In Austria and western Germany, our projected reduction of the over-all growth rate of GDP, as compared with the whole period 1953-1967 (although less so as compared with the 1960s), is associated with a certain slowing down of the rate of over-all productivity increase. Such a slowing down appears to be in accordance with the cross-country pattern. But it is by no means certain, and it is true that in these two countries the slowing down in output growth in the 1960s was not accompanied by any marked slowing down in productivity growth. A continuance of the 1953-1967 productivity growth rates would in fact remove the labour supply gap in Austria and reduce it to a very small figure in western Germany. It may also be noted that the gap in Sweden would be somewhat reduced if past over-all productivity growth continued. A different case is the United Kingdom, where the projected acceleration of GDP growth is associated with a projected acceleration in productivity growth (by about half of 1 per cent a year). If this should not occur, the labour supply gap, for the projected output growth, would be correspondingly increased.

Secondly, the labour supply projection allows for effectively no migration (an assumption dictated simply by the difficulty of finding any alternative hypothesis). But some of the countries with apparent gaps have in fact been, and still are, significant immigration countries. This is particularly true of western Germany but a flow of immigrants no greater than in the past could not make a significant impact in the other countries showing labour supply gaps.[136]

Thirdly, there is the possibility of increased activity rates, mainly for women. The Secretariat study already referred to [137] suggested various alternative hypotheses for activity rates; one of them (Variant IV) assumed an increase in activity rates for women in industrial west European countries, by 1980, to the rates prevailing in the United Kingdom (which showed the highest rates) in 1965. This variant would remove the labour supply gap in our projections in Belgium and could reduce it substantially in western Germany (by about 800,000).

Finally, further small reductions in the agricultural labour force, beyond those proposed in our hypotheses, are not to be ruled out. This could significantly affect the labour supply gap (of about 1 per cent) in Finland, where our 1980 projection for employment in the agricultural sector—which includes forestry—amounts to as much as 17 per cent of the total labour force.

The conclusion remains that only very few of the GDP growth rates—notably those for Denmark, Sweden and the United Kingdom—must be regarded as subject to a serious labour force constraint, unless a marked increase in the growth of productivity, or in the elasticity of the labour supply, should occur. These are three countries in which the projected growth of labour supply—always assuming no net migration—shows among the biggest reductions from the past trend, while our output projections show constant growth rates for Denmark and Sweden, and an acceleration—to a rate more in accordance with its income level—in the United Kingdom. The labour supply constraint is, indeed, recognised, as is shown by the efforts being made to carry through active manpower policies and redeployment of the labour force.

---

[136] France is also a net recipient of immigrants, hitherto at a rate quite sufficient to offset the small apparent shortage in the projections. For some incomplete data on migration see " Determinants of Labour Supply in Europe " (*op. cit.*) especially chart 8 on page 221.

[137] " Determinants of Labour Supply in Europe " (*op. cit.*) especially table 27 on page 244.

It must, however, be recalled that the output projections put forward in this study are not in any sense intended as growth " targets " or forecasts. They are constructed in accordance with a special set of assumptions; in the present section of the study we are concerned only to show how far the output projections, if treated as practicable or desirable, can be regarded as consistent with the range of possibilities about the development of labour supply and productivity.

The manpower balance in southern Europe

The discussion above has been confined to the industrial countries of western Europe. Over-all labour supply is evidently not a constraint on economic growth in southern Europe (even though supply of labour with particular experience and qualifications may well be a constraint). The important question, rather, is how far the projected growth rates for the non-agricultural sectors are likely to absorb the reserve of manpower in agriculture.

Some estimates have been made above, on certain hypotheses about the development of relative productivity in agriculture, of the labour supply likely to be available for non-agricultural sectors (see table 3.25). These estimates can be compared with our projections of the growth of output in non-agricultural sectors to yield projections of implied productivity change. Although we have not applied to the southern countries the equations linking output growth with productivity growth, the past trend of productivity growth may serve as a crude test of plausibility. The results are shown below.

Southern Europe: Non-agricultural sectors Projections 1965-1967 to 1980 — *Per cent a year*

	Output	*Labour supply* [b]	*Implied productivity increase*	*Trend rate of productivity increase 1953-1967*
Greece	7.8	3.2 to 3.7	4.5 to 4.0	[c]
Portugal	7.2	2.1 to 2.2	5.0 to 4.9	4.7
Spain	7.0	2.3 to 2.5	4.6 to 4.4	4.4
Yugoslavia [a] ...	8.9	6.0 to 6.7	2.7 to 2.1	6.3

[a] Gross material product excluding agriculture.

[b] Range resulting from Hypotheses I and II for agricultural productivity (see tables 3.24 and 3.25).

[c] Employment and productivity figures not available.

So far as this comparison goes, it suggests a certain consistency in the manpower and non-agricultural output projections for Portugal and Spain, and probably for Greece. For Yugoslavia the assumptions about agricultural output and employment clearly indicate a greater labour supply for other sectors than is likely to be absorbed even with the high rate of output growth in these sectors.

In all the southern countries, however, the basic problem remains. Output, and income, per person engaged in agriculture remain, on our projections, very low. This is associated with high shares of agriculture in total employment (20 to 30 per cent projected for 1980—see table 3.24) which represent a potential for emigration, or for still faster growth.

Comparisons with some national projections for industrial western Europe

Most projections by national authorities, unlike those set out here, rest upon forecasts of labour supply combined with rather different approaches to the projection of productivity. Comparisons of some major variables, covering four countries for which national projections applying to a similar future time-span are available, may however be useful for assessment of our projections. Exact comparison of the projections is impossible, for example because of differences in the precise time-spans covered and in the degree of detail by sectors. But a broad comparison illustrates some of the problems that must arise in any long-term projection, and the points at which different methods of approach yield different results.[138]

France

In the course of preparing the Sixth Five-Year Plan (1971-1975) longer-term projections have been made by the French Authorities extending to 1985. For the period 1965 to 1980, the French projections imply a growth of real gross national product (factor cost) at the rate of about 5.7 per cent a year,[139] as compared with our projection of 4.6 per cent. Over half of this difference is due to the recent revision of French national accounting statistics, the result of the revision being to add rather more than half a percentage point to the previously recorded growth rate in 1962 to 1967. Past trends in the present study were based on the unrevised series; adaptation to the revised series would have added about 0.7 per cent to the projected growth rate, raising it from 4.6 per cent to about 5.3 per cent.[140]

---

[138] A set of projections to 1980 for member countries is being compiled by the OECD, but the final figures are not available at the time of writing.

[139] This corresponds to an increase of 6 per cent a year in " Production intérieure brute " at market prices (French national accounting concepts, which differ slightly from the UN Standard National Accounting system). The 6 per cent for 1965 to 1980 implies about 6 per cent for the period of the Sixth Plan; which is the figure selected by the French Government for the preparation of the Plan.

[140] When the calculations for the present study were made, the revised series was available only from 1962. It is uncertain by how much revision of the complete series back to 1953 would increase the estimate of the growth rate. The revision also raises the *level* of GDP per head, in 1965-1967, by about 6 per cent. In itself, this would have the effect of reducing the projected growth rate of GDP, but by less than 0.1 per cent. It is more important that the upward revision of output series appears to have affected chiefly manufacturing output. Since our projections are in part based on the extrapolation of past trends in manufacturing output, the effect of introducing the revised figures would have been to increase significantly the projected growth rate.

For the rest, the projections of the French authorities rest upon a higher estimate of the future growth of annual labour productivity[141]—at least a continuance of past rates in contrast to the slowing down implied by our analysis. This is a basic assumption of the French projection, which specifically implies economic policies, and changes in past trends of economic performance, promoting accelerated growth of industry and sufficient price stability for greater industrial competitiveness at home and abroad. In addition, more recent demographic projections by the French authorities (including an allowance for immigration) have led to a significantly faster increase in manpower supply than the 0.5 per cent annual growth that we used.

Exact comparisons of output projections by sectors cannot be made. But it is apparent that the faster growth rate envisaged by the French authorities is to be found chiefly in manufacturing industry. The French projections also show considerably faster growth in transport than our projections, but only slightly faster growth in the energy and trade sectors. At the same time, growth of agriculture is expected in the French projections to slow down to less than 1 per cent a year (against 1½ per cent in our projections, and compared with well over 2 per cent in 1953 to 1967).

Western Germany

The official projection for western Germany[142] contains two variants: the highest, envisaging a growth of real GDP at the rate of 4.3 per cent a year from 1965 to 1980, is very close to that resulting from the present study—4.6 per cent. (The lower west German official variant is 3.5 per cent). But our projected slowing down of productivity gains— from 4.3 per cent a year in 1953 to 1967 to 3.3 or 3.4 per cent in future—implies, as was shown above, a substantial shortfall (17 to 18 per cent by 1980—see table 3.37) against projected labour supply; the higher of the alternative west German projections is based on the rate of over-all productivity gains being maintained (at 4.3 per cent a year). The west German labour supply projections, envisaging, on either alternative, no significant change in total employment between 1965-1967 and 1980, are effectively the same as ours.[143] Thus the crucial issue is whether in fact past rates of productivity growth can be maintained with a slower rate of growth of output and employment.

The sectoral output projections—which are given in the official projections in even broader groups than ours—do not suggest substantial differences of view about the pattern of development. In particular, the growth of agricultural output is put at 1.4 per cent which agrees with the OECD projections used in the present study (see table 3.22); agricultural employment is projected to fall at just over 3½ per cent a year (compared with our alternative estimates of 3 per cent and 4½ per cent), implying about a 40 per cent reduction between 1965 and 1980.

Italy

A set of official projections for the period 1971 to 1980 (known as “ Progetto ’80 ”)[144] was published in 1969, and served as a framework for the second medium-term economic plan (1971 to 1975). “ Progetto ’80 ” contains four alternative growth rates. The first two yield a 5 per cent growth of GDP, and imply almost no increase—only about 0.1 per cent a year—in employment over the future period. (The differences between the two alternatives are only minor). Broadly speaking, these two alternatives represent a continuation of past trends in the rates of growth of output, employment and productivity and in the balance between the major sectors. The negligible increase in total employment which results from extrapolation of past trends in output and productivity would, however, conflict with the forecast increase in manpower supply. Over the period 1965-1967 to 1980, the total manpower supply is expected to increase—assuming no net migration—by nearly 2 million, or 0.7 per cent a year.

Taking the view that the growth of labour productivity is more likely in fact to accelerate, at least in non-agricultural sectors, the authors of “ Progetto ’80 ”, have presented two higher alternative growth rates of GDP—5.85 and 6.55 per cent a year. Although these alternatives allow for somewhat faster growth of productivity, they are expected to result also in a faster growth of employment—respectively, 0.75 and 0.95 per cent a year (about 2 per cent a year, in both cases, in non-agricultural employment).

Our own projection of the growth rate of GDP (5.3 per cent a year) is similar to the two lower alternatives in “ Progetto ’80 ”. The forecasts of the future labour supply are in agreement. Our projection differs, however, in that it is based on a certain slowing down of the growth of over-all labour productivity as compared with the past trend, and, consequently, in a slight excess of demand for labour over the expected supply (table 3.37). This is partly because our projections for individual sectors, and particularly for manufacturing, represent a slowing down of output growth from past trends, but partly, also, because the past rate of growth of productivity in Italy, in relation to output growth, was significantly higher than is suggested by inter-country comparisons (Table 3.11).[145]

The implication resulting from our projections of the development of a labour shortage (Table 3.37) is however misleading (even if the projected fall in the rate of productivity growth is overstated). The forecast of labour supply rests upon virtually unchanged specific activity rates, and these rates, especially for women, are particularly low in Italy just because of the low level of demand for labour. Thus the forecast increase in labour supply cannot be regarded as a full measure of the future demand for jobs. It is improbable that a genuine degree of " full employment " could be achieved except by a significant acceleration of the growth rate from its past trend—probably to about the rate proposed in the highest of the four alternatives of " Progetto '80".

---

[141] The French estimate for annual productivity growth is 5 per cent a year for the whole non-agricultural sector, allowing for an average working week by 1985 of 41 hours and 5 weeks of holiday.

[142] Bundesministerium für Wirtschaft: “ Perspectiven der wirtschaftswachstum bis zum jahre 1980 ”, *Die Wirtschaftliche Lage* 3rd quarter, 1968.

[143] The west German higher variant includes an increase in the foreign labour force from 1 million to 2 million. But this would add only 4 per cent to the 1980 labour force as computed on the assumption of no net migration.

[144] Ministero del Bilancio e della Programmazione economica, “ Rapporto preliminare al Programma economico nazionale 1971-1975 (Progetto ’80) ” in *Mondo Economico*, Supplement, 26 April 1969.

[145] The growth of total GDP in our projections is about the same as the past trend, because of the changing balance between the major sectors.

Sweden

The special feature of the projections now being prepared in Sweden for the period 1970 to 1980 is that the changes assumed in the pattern of final demand, combined with no increase in manpower supply and reduced working hours, may well carry with them a significant (nearly 1 per cent) reduction in the over-all growth rate to about 3½ per cent a year.[146] This contrasts with our projection of a growth rate of GDP maintained at the past trend of just over 4 per cent a year. Our output projection, as has been pointed out, would, however, require a considerable acceleration in the increase of over-all productivity or a greater increase in the labour force than current trends in activity rates suggest. Thus the lower growth rate in the Swedish projection represents one solution to the problem posed by our own projections.

The problem emerges clearly from the main lines of the tentative Swedish projections. On the supply side, the size of the total labour force is expected to remain constant (in accordance with the national manpower projections that we have used). But reductions in working hours—to 40 hours a week by 1975 and a further fall thereafter [147]—are expected to reduce the total input of man hours by about 0.6 per cent a year during the 1970s. The development of over-all labour productivity is heavily influenced by one of the basic assumptions of the Swedish study. This is the continued expansion of public consumption at the rate of about 5 per cent a year. Although an increasing proportion of public consumption will consist of goods and services bought from outside the public sector (a general tendency noted above), yet an increase of labour input in the public services sector is implied of as much as 3 per cent a year. The result will be a growth of the proportion of the labour force in public services from 15 per cent in 1965 (19 per cent in 1970) to over 25 per cent by 1980,[148] and a steady decline in employment in other sectors (about 2 per cent a year in industry and 3 or 4 per cent a year in agriculture and forestry).

Thus, although it is expected that growth of labour productivity in individual sectors, and notably in manufacturing, will accelerate, yet the effect of the shift towards public services—with their low level of recorded productivity—will be a decline in the growth of total labour productivity.[149] Our own output projections differ in two main respects. First, we do not envisage so marked a shift towards public services: we assume that this growth will be rather slower than that of GDP, as in 1953 to 1967, instead of considerably faster. Secondly, we assume a certain slowing down of productivity growth in manufacturing—the main reason for the pressure on labour supply indicated by our projections—instead of the acceleration envisaged in the Swedish projections.[150] The Swedish projections indeed envisage a growth of industrial productivity per man-hour of over 6½ per cent (perhaps 5 to 6 per cent in annual productivity); by comparative standards this is extremely fast, especially in conjunction with the projected output growth of only 4 per cent.

Yet even if the accelerated productivity gain is accepted, the Swedish projections, as their authors point out, imply only a very moderate rise in private consumption—about 2 per cent a year, against 4 per cent a year in the past. Thus the balance between private and public consumption may become a major problem for a policy of growth.[151]

* * *

It will be noticed, without much surprise, that a common feature of these comparisons—and a very crucial one—is the difference in the projections of productivity growth. The four national projections reviewed here all envisage the continuance, or even the acceleration, of past trends in the increase of productivity. By contrast, our own projections envisage for these four countries—as for most industrial countries—a slowing-down of productivity increases in industry and no acceleration of over-all productivity growth. The main reason for our more cautious results, which are largely derived from cross-country comparisons, is the projected slowing down of manufacturing growth in most industrial countries, combined with the slower rates of productivity growth that we find from past experience to be associated with slower rates of output growth.

---

[146] For a general account of the main lines of Swedish thinking, see Erik Höök " Perspectives on the Swedish Economy " in *Skandinaviska Banken*, *Quarterly Review 1969:4*. A further report on the prospects for the 1970s is expected to be published shortly.

[147] This apparently takes account of an expected increase in part-time work.

[148] The Swedish proportions quoted are in terms of man-hours. They are roughly comparable with the 17 per cent of total numbers employed in Public Services in table 3.27.

[149] As has already been observed, the Swedish estimates of GDP growth do not allow for any increase in " productivity " in the public services (see table 3.26), and are thus conservative in relation to the estimates made by many other countries. This downward " bias " in the Swedish output estimates, relatively to those of other countries, will increase if the growth of employment in public services in fact exceeds that of total employment.

[150] There is some compensation in our projection in that we have assumed a slight fall in output of agriculture and forestry, and a bigger fall in employment in that sector, than the Swedish projection. This assumes a constant level of output (agriculture proper declining, but forestry continuing to increase).

[151] See Erik Höök *op. cit.* However, it may also be noted that the growth of total population is forecast to slow down from 1.0 to 0.5 per cent a year (*Economic Survey of Europe in 1968*, table 19, p. 223).

APPENDIX 3.I

Formalized statement of the relationships between manufacturing growth and GDP growth

The purpose of this note is to give a full account of the methods used for the analysis in section 3.3(i).

Equation numbers: the general forms of the equations, relevant to this appendix only, are given as A1, A2 etc. Actual estimates have the same numbers as in the main text (3.4, 3.11, etc.).

Symbols used (all variables which are not otherwise specified are in terms of annual percentage changes in output volume):

X = GDP
X' = GDP/head at US \$, 1963 factor cost, official exchange rates
Y = manufacturing
Z = non-manufacturing sectors
E = elasticity
a and b = the constants in the equation relating manufacturing growth to the level of GDP/head
c and d = the constants in the equation expressing elasticity as a function of manufacturing growth
w_y and w_z = the weights of the manufacturing and non-manufacturing sectors respectively ($w_y + w_z = 1$)

Thus:

$$X = Yw_y + Zw_z \qquad (A1)$$

$$E = \frac{Z}{Y} \qquad (A2)$$

$$Z = EY \qquad (A3)$$

Hypotheses: The hypotheses formulated and the basis for them is found on pp. 58 and 78. They could be expressed as follows:

$$Y = f\,(X') \qquad (A4)$$

$$E = f\,(Y) \qquad (A5)$$

It follows that:

$E = f\,(X')$ and, from A1, A4 and A6, that (A6)

$$X = f\,(X') \qquad (A7)$$

Specifications: Our basic hypothesis is that manufacturing growth can be regarded as the " motor " of total economy and that it is related to the level of GDP/head in such a way that growth rates become lower when the level of GDP/head becomes higher. Various experiments gave the result that this relationship was best expressed by an equation of the type (see section 3.2(i)).

$$Y = a + b\,\frac{1}{X'} \qquad (A8)$$

The estimate of this equation, in which the United Kingdom and Ireland were excluded, gave the following result :

$$Y = 2.82 + \frac{2888.3074}{\text{GDP/head}} \quad (r = 0.96;\ \sigma = 0.74) \qquad (3.4)$$

Our next step was to make an estimate for the elasticity of non-manufacturing growth on manufacturing growth as a function of manufacturing growth rates. We chose the form:

$$E = c + \frac{d}{Y} \qquad (A9)$$

The best estimate of this equation, in which the United Kingdom and Ireland were excluded, gave the following result:

$$E = \frac{2.0019}{Y} + 0.37 \quad (r = 0.73;\ \sigma = 0.09) \qquad (3.11)$$

The equation was also estimated for each individual country on the basis of the five-year moving averages of elasticities and growth rates. The results of these estimates are found in table 3.7. By estimating equations (A8) and (A9) we have obtained " international " values for the coefficients *a*, *b*, *c* and *d* as well as " national " values for the coefficients *c* and *d*.

Integration of the equations for manufacturing growth and for elasticity of non-manufacturing growth

From equations (A1) and (A3) above, it is clear that

$$X = Yw_y + EYw_z \qquad (A10)$$

By means of equations (A8) and (A9) above, this can be written as:

$$X = (w_y + cw_z)\,(a + \frac{b}{X'}) + dw_z \qquad (A11)$$

Since the second parenthesis is equal to Y we can also write:

$$X = \alpha + \beta\ Y \qquad (A12)$$

where, of course, $\alpha = dw_z$ and $\beta = w_y + cw_z$

This last pair of equations can be used in various ways. First of all we can make a direct estimate of equation (A12) on the basis of the observed values for X and Y. This is what we have called an international pattern for GDP-growth as a function of manufacturing growth. Because of the identity between equations (A12) and (A11), this is the same as saying that we have established an international pattern for the coefficients c, d, w_y and w_z also.

The best direct estimate of equation (A12), in which the United Kingdom but not Ireland is included, was found to be:

$$X = 1.12 + 0.6002\ Y \quad (r = 0.97,\ \sigma = 0.38) \qquad (3.8)$$

It was said above that the estimation of equation (A12) also gave us an " international " pattern of the coefficients c, d, w_y and w_z. Since we already had a pattern for coefficients c and d from the estimate of equation (A9) above, it is now possible to distinguish between the patterns for the coefficients in the elasticity-function and the pattern for the weights. This is done by computing equation (A11) for each country and using the national values for the weights but the international values for the elasticity coefficients. The estimates of GDP-growth done in this way are then compared with the estimates obtained by equation (3.8) above. The difference between them is due to differences between the national and the international weight-systems and is presented in table 3.9, column 7.

The next step is to compute again for each country the equation (A11), but this time with national values on both the weight and the elasticity-coefficients. (The latter are found in table 3.9). This new series of values for GDP growth is also compared with the estimates made by equation (3.8). This time, the difference consists of effects of divergences both in the weights and the elasticity-functions. Since the former have just been distinguished, it is easy to obtain separate values for the effects of differences between national and international elasticity systems. These results are accounted for in table 3.9, column 8.

There is one important comparison that remains to be made. Going back to equation (A11) we see that it can also be written as:

$$X = (w_y + cw_z)\, a + dw_z + \frac{w_y b + cw_z b}{X'} \qquad \text{(A13)}$$

or simply

$$X = \gamma + \frac{\delta}{X'} \qquad \text{(A14)}$$

where, of course, γ equals the whole expression before the fraction in equation (A13) and δ equals the numerator of the fraction. This gives an expression for GDP/growth as a function of the level of GDP/head. A direct estimate, in which the United Kingdom and Ireland are excluded, gives the following results:

$$\text{GDP-growth} = 2.85 + \frac{1723.7705}{\text{GDP/head}} \quad (r = 0.95,\ \sigma = 0.52) \quad (3.12)$$

The estimate of this equation can be said to incorporate the international pattern for all the variables that we have worked with, namely manufacturing growth, elasticities and weights, all in relation to the level of GDP/head. Two important results can be deduced: (*a*) a comparison with the outcome of the estimate of equation (3.8) will give the total net effect on GDP-growth of deficiencies in manufacturing growth, since the latter equation is based on actually observed manufacturing growth rates. This comparison is made in table 3.9, column 4. (*b*) On the other hand, when we compare the rates of GDP growth calculated from (3.12) with the actually observed rates, we get an expression for that part of the difference which is not " covered " by other effects, such as differences in weights and elasticity-functions (column 5 in table 3.9).

The following indication may be given of the precision of the direct estimates. The coefficients α, β, γ, and δ have been defined in terms of a, b, c, d, w_y and w_z above. If we compute a theoretical value for the coefficients designed with Greek letters using the estimates of the " latin " coefficients, and compare them with the values actually obtained in the estimates, we get the following results:

Coefficient	*Theoretical value*	*Estimated value*
α	—	1.12
β	0.65	0.60
γ	2.95	2.85
δ	1877	1724

The last difference, which may seem big, means only a difference of 0.15 in GDP-growth rate at a GDP/head level of $1,000 and 0.07 at a level of $2,000. Since both values are surrounded by a certain standard error of estimate, it can be concluded that they are not significantly different. In the following reference table, estimated values are given of the main aggregates at certain standard levels of GDP per head.

Reference table showing growth of certain aggregates at standard levels of GDP/head

	Annual percentage changes in output			*Elasticities on manufacturing growth*		*Annual percentage changes*			
						Productivity growth		*Employment growth*	
Level of GDP/head at 1963 factor cost US$	*Manufacturing growth (3.4)* *	*Non-manufacturing growth (3.13)* *	*GDP-volume growth (3.12)* *	*Non-manufacturing (3.11)* *	*GDP (3.9)*	*Manufacturing (3.6.a)* *	*GDP* [a]	*Manufacturing (3.7.a)* *	*GDP* [a]
500	8.6	5.5	6.3	0.60	0.72	6.3	5.2	2.2	1.0
750	6.7	4.6	5.2	0.67	0.77	5.1	4.3	1.5	0.8
1000	5.7	4.1	4.6	0.72	0.81	4.5	3.8	1.2	0.7
1250	5.1	3.8	4.2	0.76	0.84	4.1	3.4	1.0	0.7
1500	4.8	3.7	4.0	0.79	0.86	3.9	3.3	0.9	0.7
1750	4.5	3.5	3.8	0.81	0.88	3.8	3.1	0.8	0.6
2000	4.3	3.4	3.7	0.84	0.89	3.6	3.0	0.7	0.6
2250	4.1	3.4	3.6	0.86	0.91	3.5	2.9	0.6	0.6
2500	4.0	3.3	3.5	0.87	0.92	3.5	2.9	0.6	0.6
3000	3.8	3.2	3.4	0.90	0.94	3.3	2.8	0.5	0.6
3500	3.7	3.1	3.3	0.91	0.95	3.3	2.8	0.5	0.6

* Number of equation.

[a] Table 3.10.

CHAPTER 4

INTERNATIONAL COMPARISONS OF REAL INCOMES, CAPITAL FORMATION AND CONSUMPTION

(Note on a methodological experiment)

(i) The objectives

The difficulties inherent in international comparisons of per capita income levels in real terms are numerous and well-known. The most serious among them arise from the frequent disparities between official exchange rates and the real purchasing power of national currencies, and from differing internal price relatives which distort structural, and thus global, comparisons.

Such comparability problems exist both among the west European market economies and within the group of centrally planned economies of eastern Europe. It goes without saying that the difficulties encountered in making comparisons of real income levels within these two groups of economies are greatly magnified in east-west comparisons.

As the interest in comparing development levels reached in various countries grew after the last war, numerous attempts have been made to measure them. Firstly, attempts have been made to revalue national products and sub-aggregates in some " neutral " prices, or—in comparisons between two countries—in two sets of national prices. Such " re-pricing " methods were used in the by now classical study by Gilbert and Kravis in the mid-1950s.[1] A rather similar exercise was carried out by the secretariat of the Council for Mutual Economic Assistance in comparisons between the countries of eastern Europe and the Soviet Union,[2] and in a number of other inquiries with varying degrees of disaggregation and geographical coverage. In the field of comparisons relating to consumption levels, special mention should be made of the inquiry undertaken jointly by the statistical offices of Poland and Austria, under the auspices of the Conference of European Statisticians.[3] In conjunction with the University of Pennsylvania, the United Nations Statistical Office has recently initiated an " International Product and Purchasing Power Comparison Project " aimed at comparing by re-pricing methods the levels of gross domestic product of some 15 countries, mainly in Europe, with that of the United States, and the Conference of European Statisticians is endeavouring to promote additional comparisons between pairs of countries participating in the project, with a view to facilitating the checking of results of indirect comparisons between countries (i.e. through a third country) by means of direct comparison.

However, these re-pricing methods are very expensive and time-consuming. For this reason, other approaches, usually referred to as " short-cut methods " are also being tried. These relatively recently developed techniques rely on the use of physical or " non-monetary " indicators of output and/or consumption, and on application of regression analyses of varying complexity. One approach, largely followed in the present note, was developed by F. Janossy and E. Ehrlich in Hungary, with the purpose of comparing income levels in Hungary with those in other countries.[4] W. Beckerman made a contribution to the technique by introducing multiple correlation analysis applied to a relatively small number of physical indicators.[5] A multi-variate correlation approach has also been applied in a major project, undertaken by the United Nations Research Institute for Social Development, to study the inter-relationships between social and economic development in various countries and world areas.[6]

The purpose of the present exercise is to estimate per capita real income levels in European countries, east and west, in 1965, by refining somewhat the techniques of computation employed in previous experiments of this kind. Whilst the actual refinements are described in some detail below, it can be stated here that the focus is essentially on two sets of comparisons. For the reasons spelled out below, the method used in the present approach is best suited for comparisons of income levels among west European countries, and this forms the main part of the inquiry. The results obtained can be compared not only with data on per capita incomes at official exchange rates, but also with some results obtained in other special studies, based on both re-pricing and short-cut methods.

---

[1] M. Gilbert and I. Kravis, *An International Comparison of National Products and the Purchasing Power of Currencies*, OEEC, 1954. Mention should be made of the pioneering approach of Colin Clark in using " international units " and " oriental units " in comparing levels of development in various regions and countries (*Conditions of economic progress*, London 1940).

[2] Some results of this study were presented in *Sopostavlenye urovney ekonomicheskovo razvitia sotsialisticheskikh stran*, Moscow 1965.

[3] See " Comparisons of levels in consumption in Austria and Poland ", Conference of European Statisticians, *Statistical Standards and Studies*, No. 16. The Conference has also sponsored a comparative study of industrial labour productivity in Czechoslovakia and France (the results of which have appeared in document Conf. Eur. Stats/WG.21/9).

[4] F. Janossy, " A gardasàgi fejlettség mérhetösége és uj mérési módsrere ", *Közgadasagi es jogi Könyvkiado*, Budapest 1963, and E. Ehrlich, " An examination of the inter-relation between consumption indicators expressed in physical units and per capita national income ", *Czechoslovak Economic Papers*, October 1966. G. Szilàgyi experimented with both time-trends and cross-country approaches in his attempt to compare income levels in six east European countries (" A simplified method for the international comparison of national income ", Symposium on National Accounts, Warsaw 1968).

[5] *International Comparisons of Real Incomes*, OECD Development Centre, 1966. See also W. Beckerman and R. Bacon, " International comparisons of income levels; a suggested new measure ", *Economic Journal*, September 1966, No. 303.

[6] For preliminary results, see United Nations Research Institute for Social Development, *Research Notes*, Nos. 1 and 2, Geneva, June and July 1968.

Secondly, the inter-relationships between various non-monetary indicators and GDP levels based on the experience of western countries can be used to throw some light on the comparative levels of income among east European countries, and these estimates can in turn be compared with the results of other inquiries undertaken in the area.

It is tempting to push the analysis a step farther, by using the estimates obtained for comparisons between eastern and western countries. This procedure could, however, be criticized on the grounds that the set of physical indicators introduced into the exercise on the "western" side contains in fact a certain pattern of weights given to various aspects of economic and social development. Given the different strategy of growth in east European countries (the emphasis on productive investment, basic and heavy industries, etc.), it can be argued that the same set of indicators should not be used for the explicit purpose of east-west comparisons. Nevertheless, the distortions due to this factor are probably not large enough to preclude the use of GDP estimates of all countries as "observations" for some analytical purposes, for instance in a Chenery-type cross-country analysis.

In the second stage of the exercise, the experiment in a "short-cut" approach was extended to cover, in turn, capital formation and consumption. Thus, independent estimates of these two sub-aggregates were obtained which throw some light on international differences in the structure of domestic expenditure.

(ii) The method

It is well-known that many physical indicators of output or consumption are rather closely related to over-all levels of output, consumption or income, both between countries and over time. This means that knowing, say, per capita consumption of energy in a country, one can obtain an idea of its "real" per capita national income by reference to a pre-determined relationship between per capita energy consumption and per capita income. The latter inter-dependence can be derived from the historical experience of a country or a number of countries, or from a static cross-country comparison at one point of time.

The application of such techniques for estimating per capita income levels opens up a whole range of choices with regard to the selection of physical indicators, and of the countries to provide the "observations", as well as with regard to the nature of the mathematical relationship sought.

In the present exercise, the "observations" were provided by income levels (expressed in United States dollars at official exchange rates) [7] and physical indicators, in seventeen west European countries and in five of the most developed "overseas" countries (the United States, Canada, Australia, New Zealand and Japan) in 1965.

The selection of indicators

The first step was to find appropriate non-monetary indicators which correlate well with per capita income levels. In the context of the present study, the following criteria of selection were applied. Firstly, since each indicator yields its own ("individual") estimate of income level (y_i), it was desirable that the selected indicators should be available for all the countries under study. The comparability of the final estimates $\left(\frac{\sum y_i}{N}\right)$, where N stands for the number of indicators, is somewhat weakened for countries for which some indicators (and therefore also the corresponding "individual" estimates) are missing. This requirement seriously restricts the range of usable indicators. The choice is further limited by the obvious *desideratum* that the indicators be comparable between countries, i.e. that they do not differ qualitatively. In practice, this is an impossible condition to adhere to fully, and some compromises are unavoidable. The resulting bias acts in the direction of narrowing the true gap in income levels between the high income and the low income countries, insofar as higher income levels are associated with a better quality of goods produced and consumed.

Thirdly, it is desirable that the selection of indicators should cover a wide range of social and economic aspects of development. The conceptual framework of the present approach does not involve building up an over-all income aggregate by adding up various sub-aggregates derived from a series of representative indicators. Indeed, in theory one perfect indicator would do. In practice, however, there is no such single indicator, since policies differ between countries with regard to the emphasis given to the various facets of development. In order to reduce such differences it seems helpful to rely, in the final account, on the average of a large number of "individual estimates", possibly derived from a wide variety of indicators.

In a preliminary investigation, some 36 indicators were examined. Of these only about 30, which showed at first glance a rather high degree of correlation with income in western countries at official exchange rates, were retained for further experimentation, i.e. for curve-fitting. However, some indicators were merged to provide a composite index. This applied to consumption of textiles and of non-ferrous metals, where consumptions of wool, cotton and rayon yarns and synthetic fibres on the one hand, and those of copper, zinc and lead on the other, were weighted by their prices in international markets. Consumption of energy from all sources (expressed in coal equivalents) is also a synthetic index, but these data are available from United Nations statistical sources.

---

[7] The use of official exchange rates to derive estimates of gross domestic product in dollars introduces a factor of uncertainty but it is considered that its possible effect on the results of the present study is not significant. The values converted at official exchange rates are used only as points of observation in the scatter diagrams and since the deviations of the official exchange rates from the real purchasing power ratios are not systematic, it is assumed that the shape of the curves would not be much different if more realistic GDP values were used.

Rigid classification of the non-monetary indicators actually used for individual income estimates is not possible nor, for reasons already mentioned, particularly desirable. As an indication of the wide range covered, it may be mentioned that there are 8 indicators which refer to industry and energy (consumption of steel, cement, sulphuric acid, non-ferrous metals, total energy, electric energy in industry, plastics and textile yarns), two to level of agricultural development (share of agricultural employment and milk yield per cow), three to food consumption (animal proteins, cereals and sugar), two to consumer durables (passenger cars and television sets), two to development of communications (circulation of letters and telephone stock), two to cultural levels (paper consumption and student enrolment), one to housing conditions (persons per room) and one to health (infant mortality in the second half year of life).

The final test for the inclusion of an indicator (and of the corresponding income estimate) was whether or not an empirical cross-country relationship with income levels could be established, yielding a strong and statistically significant correlation. As will be shown below, for every accepted indicator the correlation coefficient was at least 0.7 and in most cases it exceeded 0.8 (thus "explaining" about two-thirds of the total variance); in all cases its value was statistically significant at one per cent level (i.e. the correlation was definitely not due to sampling fluctuations). The values of 21 indicators used for the calculation of individual estimates of per capita GDP (and in the later stage, those of capital formation and consumption) are shown in Appendix Table 4.I for 22 "western" countries and for 8 east European countries, including Yugoslavia.[8]

Curve-fitting

Ten types of equations were experimented with in order to establish a close mathematical relationship between per capita income levels (expressed in dollars at official exchange rates) and the various indicators in 22 "western" countries:

$$y = a + bx$$

$$y = a + bx + cx^2$$

$$y = a + \frac{b}{x}$$

$$\frac{1}{y} = a + bx$$

$$\frac{1}{y} = a + \frac{b}{x}$$

$$y = a + b \log x$$

$$\log y = a + bx$$

$$\log y = a + \frac{b}{x}$$

$$\frac{1}{y} = a + b \log x$$

$$\log y = a + b \log x$$

For each indicator an equation was eventually chosen which gave the highest coefficient of determination (or "explained" part of total variation), providing that the coefficients were statistically significant. The final estimating equations (or regression lines) for GDP values are shown in Appendix Table 4.II, together with the values of correlation coefficients (square root of the coefficients of determination), or correlation index as appropriate. The last column of this table refers to tests of significance, showing T values in the case of correlation coefficients and values of F in the case of correlation index (i.e. in equations of second degree). For 22 observations, the value of T greater than 2.8 indicates statistical significance at one per cent level; for the same degree of confidence, the value of F ought to exceed 5.7.

It will be seen that among those finally chosen, by far the most frequent type of equation is one in which the variables appear as logarithms, i.e. one in which the relative change of the income level is a function of a relative change in the value of the indicator. Only in two cases (electric energy in industry and sugar consumption) were the best results obtained from second degree polynomials.

The correlations appear very strong. In ten cases, the indicators "explain" more than 80 per cent of total variation in income levels between countries. Even among the "worst" indicators (sulphuric acid, cement, milk yields), the correlation coefficients are around 0.7 explaining about a half of the total variance. It will be noted that all coefficients are statistically highly significant.

The procedure was then repeated for capital formation (6 indicators) and consumption (15 indicators). For the former, all correlation coefficients except one were at least 0.8.[9] Very good results were obtained for consumption, where for 10 indicators a correlation coefficient of 0.9 was found (see Appendix tables 4.III and 4.IV).

---

[8] Dispersion of indicators around their own mean varies greatly between indicators as can be seen in Appendix table 4.II, where coefficients of variation expressed in terms of the relevant means are shown for each indicator.

[9] Annual volume of housing construction was tested for correlation with capital formation, but it yielded a relatively low coefficient (0.49) which, moreover, was barely significant at 5 per cent level.

Obtaining final estimates

The last stage of the exercise involved two steps. First " individual " GDP, capital formation and consumption estimates were obtained by substituting the values of relevant indicators for the x variable in estimating equations. This way, for each country 21 estimates of GDP, 6 estimates of capital formation and 15 estimates of consumption were obtained. For each country and for each of the three aggregates, an arithmetic average of individual estimates was then calculated, yielding the final GDP, capital formation and consumption estimates.[10] These final values, which can be considered as expressed in " average " international dollar prices of 1965, are shown in Appendix tables 4.V, 4.VI and 4.VII.

It is of interest to examine, for each country, the dispersion of " individual " values around the mean estimates. Intuitively, one feels the final estimate to be more reliable the smaller this dispersion. If the individual estimates could be thought of as a random sample of some universe of indicators, the reliability of their average (i.e. of the final estimate) would also be a function of the size of the sample (i.e. of the number of indicators of individual estimates). Of course, this assumption is not true, but it is nevertheless interesting to test the combined influence of the dispersion (i.e. variance) and of the sample size, by calculating standard errors of mean estimates by conventional methods.[11] These standard errors are shown in Appendix tables 4.V, 4.VI and 4.VII both in dollars and as percentages of the relevant final estimates calculated so as to yield " confidence limits " at 5 per cent significance levels.[12] The percentages should be read to mean that had we been dealing with random samples of indicators, there would be a 95 per cent chance that the true values of GDP, capital formation and consumption lie between the given percentage limits. They provide interesting information on the relative accuracy of the results as between countries and as between the various aggregates under study. It is important to note that the GDP and the consumption estimates are subject to a much smaller degree of error than the estimates of capital formation. At the same time, the final estimates obtained for east European countries appear to be based on a much wider spread of individual values than those for western countries. Moreover, within the latter group, the variance is considerably smaller among the more than among the less developed countries.

(iii) The results

Western countries

Estimated income levels in " western " countries in 1965 are shown in the last column of table 4.1 as deviations from the level estimated for the United Kingdom. These can be compared with the relatives based on national accounts data converted into dollars at the official exchange rates prevailing in 1965 (shown in column 1), and with the OECD estimates, shown for 10 countries in column 2. The latter refer to the original Gilbert-Kravis GNP estimates for 1955 extrapolated to 1960 and, subsequently, to 1965, by the application of trends in GNP at constant prices, based on national statistics.

TABLE 4.1

Relative real income levels in western countries, 1965

(Index numbers, United Kingdom = 100)

Country	*Official exchange rates* [a]	*OECD estimates* [b]	*ECE physical indicators estimates* [a]
Austria	71	..	76
Belgium-Luxembourg	99	98	98
Denmark	118	103	94
Finland	97	..	82
France	107	99	84
Western Germany	106	110	96
Greece	38	..	39
Ireland	52	..	64
Italy	57	68	62
Netherlands	85	90	93
Norway	106	103	86
Portugal	23	..	38
Spain	38	..	49
Sweden	141	..	112
Switzerland	126	..	97
Turkey	16	..	17
United Kingdom	100	100	100
Japan	48	..	67
Canada	139	105	115
United States	197	147	135
Australia	114	..	98
New Zealand	111	..	96

Sources: United Nations, *Yearbook of National Accounts Statistics*, 1967; Gilbert and Associates, *Comparative National Products and Price Levels*, OEEC, 1958; A. Maddison, " Comparative Productivity Levels in the Developed Countries ", Banca Nazionale del Lavoro, *Quarterly Review*, No. 83, December 1967; and Appendix table 4.V.

[a] Gross domestic product at market prices.

[b] Gross national product at factor cost (at 1965 United States relative prices).

It will be noticed that except for western Germany, the direction of the adjustments to the data based on official exchange rates brought out by the present study are the same as those emanating from the OECD estimates. Thus for Belgium, Denmark, France, Norway, Canada and the United States, both the ECE and the OECD relatives are lower than those based on official exchange rates, whereas for Italy and Netherlands, the former are higher than the latter.

Secondly, comparing the official exchange rate data with ECE estimates, it appears that the spread in income levels between countries is smaller in the latter (it is also somewhat smaller than that of the 10 countries covered by the OECD study).[13] This is largely due to the downward adjustment brought out by our data for the most developed countries such as the United States, Canada, Sweden and Switzerland. At the other end of the scale, Spain, Portugal and Japan do better according to our figures, but Turkey and Greece appear to have maintained the relative income levels indicated by the official exchange rate data.

---

[10] Other averages (geometric means and median) were also experimented with. The differences were rather small, and data based on arithmetic averages were eventually retained, since they lend themselves best to tests of statistical significance.

[11] i.e. using the formula $\frac{\text{standard deviation}}{\sqrt{N-1}}$ (where N stands for the number of indicators)

[12] This value is 1.96 standard error in large samples, but somewhat larger for smaller samples. In the present exercise, the last column was calculated according to formule $\frac{s.d.}{\sqrt{20}} \cdot 2.1$ for GDP, $\frac{s.d.}{\sqrt{5}} \times 2.6$ for capital formation, and $\frac{s.d.}{\sqrt{14}} \cdot 2.1$ for consumption.

Some narrowing of the range of income levels between countries was probably to be expected, for instance in relation to the United States. On the other hand, there might be some forces inherent in the methodology which tend to reduce the differentials in income levels evaluated on the basis of non-monetary indicators; one has already been suggested in the discussion of the quality differences between indicators. It is clear that the short-cut method fails to reflect fully the weight, as well as the quality, of services in the high income countries. Finally, the small weight of the countries (i.e. observations) at the extremes of the income range means that the shape of the curves drawn to establish the relations between income levels and indicators is largely determined by the countries in the middle of the range. This might tend to reduce the position of the more developed countries in relation to the others.

Thirdly, the ECE physical indicators estimates change the relative position of several countries within the middle range of incomes. Thus the ECE estimates of incomes in Denmark, France and Norway appear much lower in relation to income in the United Kingdom than when measured by official exchange rates. The Netherlands appears to be above rather than below Norway, and France below both the United Kingdom and western Germany.

Relative levels of per capita consumption and capital formation are shown in tables 4.2 and 4.3. The ECE estimates of relative consumption levels differ from those based on official exchange rates quite significantly and, generally, as must be expected, in the same direction as the GDP estimates. The ECE estimates of capital formation in many countries show still larger differences from exchange rate estimates. As already pointed

TABLE 4.2

Relative levels of consumption [a] and capital formation [b] in western countries, 1965

(Index numbers and percentages)

Country	*Consumption*		*Capital formation*			
	At official exchange rates	*ECE physical indicators estimates*	*At official exchange rates*	*ECE physical indicators estimates*	*Share in total [c]*	
					National data	*ECE physical indicators estimates*
	Index numbers, United Kingdom = 100		*Index numbers, United Kingdom = 100*		*Percentages*	
Austria	64	72	101	91	26	26
Belgium-Luxembourg	94	91	119	113	22	26
Denmark	113	101	144	83	22	19
Finland	86	78	140	95	26	26
France	101	81	129	94	22	25
Western Germany	93	89	155	118	27	27
Greece	39	39	50	43	22	24
Ireland	55	71	59	59	19	19
Italy	58	58	64	77	20	27
Netherlands	77	98	118	88	25	20
Norway	91	87	167	113	29	27
Portugal	24	40	22	35	17	20
Spain	36	46	48	64	23	28
Sweden	132	107	181	130	23	26
Switzerland	110	96	197	117	28	26
Turkey	17	20	12	11	14	13
United Kingdom	100	100	100	100	18	22
Japan	38	65	85	80	33	26
Canada	126	110	187	129	25	25
United States	195	137	190	128	18	21
Australia	102	98	172	104	27	23
New Zealand	102	104	146	74	24	17

Sources: United Nations, *Yearbook of National Accounts Statistics*, 1967; and Appendix tables 4.VI and 4.VII.

[a] Private and general government consumption expenditure at market prices.

[b] Gross domestic fixed capital formation at market prices.

[c] Sum of capital formation, and private and government consumption.

---

[13] It is interesting to note (see Appendix table 4.V) that in 16 out of 22 western countries the difference between the official exchange rate data and ECE estimates of GDP levels is significant at 5 per cent level.

TABLE 4.3

GDP, consumption and capital formation in western countries in 1965
(Percentage deviations of ECE estimates from national accounts)

Country	GDP	Consumption	Capital formation	Relative adjustments in consumption and in capital formation[a]
	Percentages			
Austria	+15	+12	+17	0.96
Belgium-Luxembourg	+6	−3	+20	0.81
Denmark	−15	−10	−26	1.22
Finland	−9	−9	−13	1.05
France	−16	−19	−6	0.86
Western Germany	−3	−4	−3	0.99
Greece	+12	+1	+11	0.91
Ireland	+31	+28	+28	1.00
Italy	+17	+1	+55	0.65
Netherlands	+17	+28	−4	1.33
Norway	−13	−5	−13	1.09
Portugal	+81	+71	+110	0.81
Spain	+38	+29	+73	0.75
Sweden	−14	−19	−8	0.88
Switzerland	−18	−13	−13	1.13
Turkey	+18	+19	+15	1.03
United Kingdom	+7	0	+29	0.78
Japan	+49	+69	+21	1.40
Canada	−11	−12	−12	1.00
United States	−27	−11	−13	1.02
Australia	−8	−4	−22	1.23
New Zealand	−8	+2	−34	1.55

Sources: Appendix tables 4.V, 4.VI and 4.VII.
[a] Ratios of respective indices.

out, the ECE estimates of capital formation are subject to substantially bigger error than those of GDP or consumption; the nature of the indicators available (which do not, for example, take into account important differences in import and export proportions for capital equipment) inevitably reduces the usefulness of this experimental and short-cut approach as a direct way of estimating capital formation. Nevertheless, the adjustments go some way towards reducing the often implausibly large inter-country differences in capital formation per capita displayed by exchange rate comparisons. The implication may be that inter-country price differences (or quality differences) are considerably greater for capital goods than for consumption. Other factors, including differences in methods of estimation, may also affect the comparability of statistics of capital formation in national accounts.

Eastern Europe

EEC physical indicators estimates of relative per capita levels of real income, capital formation and consumption in eastern Europe are shown in table 4.4 in relation to the levels estimated for the Soviet Union in 1965. The range of real incomes appears quite wide, those of eastern Germany and Czechoslovakia being almost exactly twice those of Romania and Yugoslavia. A similar spread was found for capital formation and consumption levels. Since the Soviet Union has the highest investment rate, its position *vis-à-vis* other countries differs quite markedly for capital formation and for consumption. For the former, the highest levels registered in eastern Europe—in eastern Germany and in Czechoslovakia—appear to be about one-fifth to one fourth higher than in the Soviet Union, but the gap is much wider for consumption. Poland and Hungary show, respectively, per capita consumption levels equal to and higher than those of the Soviet Union, but their rate of investment is distinctly lower.

Broadly speaking, these results are in line with various estimates made in the countries of the area.[14] The CMEA figures, shown in table 4.4 for 1963, are not quite comparable with the ECE estimates as they

TABLE 4.4

Relative levels of real income, capital formation and consumption in eastern Europe and Yugoslavia, 1965
(Index numbers, USSR = 100)

Country	ECE physical indicators estimates (1965)			CMEA estimates (1963)		
	Gross domestic product	Fixed capital formation	Total consumption	(Material) national income	(Material) investment	(Material) consumption
Bulgaria	83	78	87	About 90	67	99
Czechoslovakia	136	124	143	110-120	91	138
Eastern Germany	136	120	146	About 140	80	150
Hungary	96	80	109	90	63	110
Poland	94	87	99	90	62	106
Romania	66	63	71	60-70	60	..
Soviet Union	100	100	100	100	100	100
Yugoslavia	66	59	73	..	..	..

Sources: Sopostavlenye urovney ekonomicheskovo razvitia sotsialisticheskikh stran, Moscow 1965; and Appendix tables 4.V, 4.VI and 4.VII.

---

[14] They differ widely, however, from the results obtained by W. Beckerman (*op. cit.*). In his study the levels of private consumption in 1960 were equal in Poland, Romania, Hungary and Yugoslavia, and about one-third below that of the Soviet Union.

refer to net material concepts of income and its sub-aggregates. It should also be borne in mind that CMEA data were presented as approximative and preliminary, and that they refer to " bilateral " comparisons with the Soviet Union and should not, in principle, be used for other comparisons. This may explain some apparent inconsistencies between the three aggregates. For instance, the income level of Czechoslovakia seems much lower than warranted by the combined effect of investment and consumption.

Capital formation data, emanating from the ECE exercise, can be related to the sum of capital formation and consumption, or " distributed national income " according to the east European terminology. It will be seen that fixed capital formation appears to amount to around one-third of total income in most countries, the range varying from 28 per cent in Hungary to 35 per cent in the Soviet Union. The last column of table 4.5 shows the shares of net fixed investment in net material product at current prices. For several reasons, however, these are hardly comparable with ECE estimates. First, there are differences in coverage. In " gross " terms, the shares of fixed investment would rise according to official statistics to 27.7 per cent in Poland and to 31.2 per cent in Hungary. A further upward adjustment would be needed to account for the fact that, outside Poland and eastern Germany, uncompleted investment (work in progress) is counted as stock and not as fixed investment. As against this, the share of investment would be somewhat smaller if related to the service-inclusive concept of national income. On the other hand, national data at current prices are known to underestimate somewhat the share of investment, since the so-called turnover tax element of price (representing largely the amount of profit) tends to be levied on consumer goods. According to the calculations made by the Central Statistical Office of Poland, more even distribution of this tax would tend to raise the share of gross investment (in national prices) to 31.9 per cent in 1960.[15] However, the price reforms undertaken in the 1960s in most countries of the area have apparently reduced the incidence of this distortion. Nevertheless, all in all, it would seem that our estimates are not necessarily inconsistent with the national figures corrected for comparability with the western concepts.

TABLE 4.5

Shares of fixed capital formation in eastern Europe and Yugoslavia, 1965

(Percentages)

Country	*ECE physical indicators estimates* [a]	*National data* [b]
Bulgaria	32	14.8
Czechoslovakia	32	8.9
Eastern Germany	31	16.3
Hungary	28	15.8
Poland	32	17.5
Romania	32	..
Soviet Union	35	14.4
Yugoslavia	30	29.6

Source: United Nations, *Yearbook of National Accounts Statistics*, Appendix table 4.VI.

[a] Share of gross fixed capital formation in the sum of fixed capital formation, and private and government consumption.

[b] Share of net fixed capital formation (accumulation less changes in stocks) in net material product, at current prices.

---

[15] *Dochod narodowy Polski, 1955-1960*, Warsaw 1962.

APPENDIX

Non-monetary indicators,

Country	Steel consumption (kg/head) (1)	Cement consumption (kg/head) (2)	Sulphuric acid app. consumption (kg/head) (3)	Non-ferrous metals (units/head) [a] (4)	Energy consumption (kg/head) (5)	Electric energy in industry (th.kwh/head) (6)	Plastic materials consumption (kg/head) (7)	Textile yarns consumption (kg/head) [b] (8)	Animal proteins (grams/day) (9)
Austria	286	535	32	166	2 630	1.21	15.5	20.3	48.8
Belgium Luxembourg	330	451	134	415	4 724	1.40	24.6	21.2	49.5
Denmark	361	411	48	83	4 172	0.50	23.0	26.1	59.6
Finland	262	364	88	205	2 679	2.15	23.3	16.0	57.2
France	331	442	57	201	2 951	1.29	14.6	19.7	61.9
Western Germany	540	557	66	289	4 234	1.71	28.0	24.9	50.6
Greece	85	357	28	34	784	0.23	4.0	14.2	37.0
Ireland	81	320	56	60	2 284	0.36	12.0	20.2	56.1
Italy	235	399	56	115	1 787	0.91	11.8	13.4	35.0
Netherlands	313	365	87	120	3 271	1.09	18.2	25.3	51.1
Norway	365	340	31	167	3 588	6.85	19.6	25.0	50.2
Portugal	74	147	46	39	521	0.31	4.6	11.9	29.6
Spain	194	373	53	77	1 023	0.58	6.2	10.0	28.0
Sweden	682	490	74	324	4 506	3.47	24.8	24.9	54.1
Switzerland	334	715	28	276	2 668	1.43	21.5	23.2	52.5
Turkey	27	103	1	21	348	0.10	0.8	8.0	15.9 [c]
United Kingdom	424	309	60	340	5 151	1.42	14.9	27.3	53.1
Japan	294	316	58	141	1 783	1.23	19.5	25.9	24.6
Canada	531	377	98	304	7 653	4.36	..	22.6	62.3
United States	656	339	119	381	9 201	2.75	23.5	29.4	65.6
Australia	514	340	82	312	4 795	1.11	..	22.4	60.8
New Zealand	239	320	..	96	2 530	0.96	..	26.6	75.9
Bulgaria	152	285	39	96	2 571	0.68	4.0	17.1	27.4
Czechoslovakia	524	400	66	144	5 676	1.60	8.9	19.3	43.3
Eastern Germany	439	335	57	203	5 460	1.87	12.8	20.9	47.3
Hungary	220	203	40	114	2 812	0.74	4.2	13.7	37.9
Poland	271	292	34	78	3 504	0.96	4.0	11.0	42.1
Romania	206	201	28	39	2 035	0.55	3.9	8.7	25.4 [d]
Soviet Union	376	289	37	117	3 611	1.51	3.9	13.2	29.0
Yugoslavia	125	183	22	107	1 192	0.44	4.2	9.8	21.1

Sources:

Cereals:
FAO Production Yearbook 1967; Czechoslovakia and eastern Germany: *Polish Statistical Yearbook; USSR Statistical Yearbooks.*

Animal Proteins:
FAO Production Yearbook 1967; Socialist countries: *Orszagos tervhivatal tervgazdasagi intezet közlemenyi, "i" fuzet.*

Active population in agriculture (share in total active population).
FAO Production Yearbook 1967.

Persons per room:
United Nations Statistical Yearbook; United States, *Abstract of Statistics.*

Energy consumption:
United Nations Statistical Yearbook.

Cement:
OECD, *The Cement Industry Statistics*, 1967; ECE, *Annual Bulletin of Housing and Building Statistics for Europe;* for Australia and New Zealand: US Department of Interior, *Mineral Yearbook.*

Steel consumption: United Nations Statistical Yearbook.

Electric energy in industry:
ECE, *Annual Bulletin of Electric Energy Statistics;* OECD, *Statistics of energy, 1953-1967.*

Television sets:
United Nations Statistical Yearbooks.

Infant mortality (deaths 6-11 months):
United Nations Demographic Yearbooks.

Telephones per 1,000 inhabitants:
United Nations Statistical Yearbooks.

Domestic letters:
United Nations Statistical Yearbooks.

"Cultural" paper:
UNESCO Yearbooks.

TABLE 4.I

by country, in 1965

Cereals (grams/day) (10)	*Sugar consumption (kg/head)* (11)	*Milk yield per cow (litres)* (12)	*Active population in agriculture (percentage)* (13)	*Television sets, stock (per 1,000 inhabitants)* (14)	*Paper consumption* [e] *(kg/head)* (15)	*Domestic letters (per 1,000 inhabitants)* (16)	*Telephones (per 1,000 inhabitants)* (17)	*Student enrolment (per 1,000 inhabitants aged 20-24)* (18)	*Persons per room* [f] (19)	*Infant mortality (deaths in 2nd half year per 1,000 live births)* (20)	*Passenger cars (per 1,000 inhabitants)* (21)
271	41.5	2 891	20	98	25.9	114.3	139.0	90	0.91	3.2	109.0
237	31.2	3 866	6	161	37.6	233.6	167.2	128	0.62	2.1	137.4
205	56.5	3 946	15	227	46.0	126.3	286.7	127	0.69	1.3	156.5
255	43.4	3 375	32	159	42.5	84.1	181.2	110	1.31	1.4	98.6
247	35.5	2 980	18	131	30.6	147.4	125.0	169	1.01	2.2	196.2
203	36.1	3 642	11	193	39.5	146.0	149.1	82	0.88	2.0	157.0
386	17.4	990	53	—	10.6	30.2	59.4	90	1.45	3.5	12.2
277	60.9	2 308	32	114	20.0	92.2	75.6	103	0.90	2.0	99.2
356	27.2	2 790	25	117	17.8	101.1	116.0	80	1.14	4.4	106.1
200	58.9	4 207	9	172	48.0	194.4	191.3	165	0.76	1.3	103.6
204	46.2	3 240	18	131	39.1	116.5	243.9	76	0.77	1.7	125.0
344	20.3	2 887	40	20	6.5	40.6	59.8	47	1.11	13.7	26.5
284	22.5	1 500	34	55	9.4	76.6	87.7	55	0.93	5.3 *	25.5
190	40.5	3 589	12	270	56.5	172.4	437.9	116	0.83	1.0	231.9
244	52.8	3 370	10	104	58.2	245.8	380.0	62	0.69	1.6	142.2
611 [c]	16.0	620	72	0.1	2.1	10.5	11.3	39	2.30	25.0 *	2.8
215	53.9	3 797	4	248	44.9	196.7	194.5	110	0.67	1.7	167.5
394	19.9	3 228	27	183	23.1	95.3	142.9	123	1.20	2.3	21.7
184	46.7	2 881	11	271	48.1	233.3	379.5	235	0.70	1.7	269.3
168	48.2	3 665	6	362	72.3	361.1	481.4	404	0.59	1.6	386.8
236	58.2	2 170	10	172	45.6	195.9	247.4	161	0.70	1.8	254.7
236	50.0	2 939	13	156	43.0	203.1	388.3	183	0.70	2.4	271.1
521	33.4	1 741	59	23	6.7	20.8	34.0	95	1.50 [f]	4.6	1.6 *
351	42.6	2 078	16	149	8.6	139.4	105.3	94	1.30	2.2	29.2
274	32.7	2 982	19	177	15.1	74.5	97.0	77	1.19 *	3.0	38.7
374	35.9	2 214	31	82	10.1	55.5	55.8	68	1.42	3.1	10.0
392	36.5	2 252	42	66	5.5	37.6	41.1	93	1.66	4.7	7.8
520 [d]	18.7	1 480	59	26	6.6	18.0	24.9	76	. .	5.8	1.3 *
424	43.5	1 600	33	68	8.4	22.7	19.0	157	1.50 *	4.2 *	4.9 *
526	21.5	1 221	53	30	6.8	52.9	21.3	82	1.59	12.5	9.6

Student enrolment per 1,000 population aged 20-24:
UNESCO Statistical Yearbooks, and national statistics (for eastern Europe).

Consumption of sulphuric acid:
ECE, *Market trends and prospects for chemical products*, 1969.

Plastic materials, regenerated cellulose and artificial resins, consumption:
See "sulphuric acid"; for eastern Germany and Czechoslovakia: production data; for Hungary: estimate based on 1964 figure on the increase in production.

Sugar consumption:
Sugar production, plans and consumption trends, 1965-1971, London 1968.

Milk yield per cow:
FAO Statistical Yearbooks.

Textile consumption:
Quarterly Bulletin of the International Cotton Advisory Committee, April 1967.

Consumption of non-ferrous metals:
World Metal Statistics, 1966 (partly estimated for some countries on the basis of production figures and trends).

Passenger cars:
United Nations Statistical Yearbooks; Bulgaria, Romania, USSR: estimates based on *Verband der Automobilindustrie E.V.* Tatsachen und Zahlen, 1965/66.

NOTE. — In most cases, consumption data refer to "apparent consumption", i.e. production plus imports minus exports, and ignore some or all changes in stocks.

[a] "Units" consists of consumption of copper, zinc and lead, weighted by average prices in world markets in 1965.

[b] Consumption of cotton, wool, rayon and synthetics, expressed in cotton equivalents (cotton = rayon = 1/4 wool = 1/4 synthetics).

[c] 1960-1961.

[d] Estimated on the basis of the 1963 figure.

[e] Newsprint and paper used for books.

[f] As given in population censuses taken around 1960.

APPENDIX TABLE 4.II

GDP, 1965: Estimating equations

Non-monetary indicator Description [a]	*Number of observations*	*Coefficient of variation of x as percentage of $\bar{x}$*	*Estimating equation*	*Coefficient or index * of correlation*	*Value of T or F ** [b]
Steel consumption	22	55	$\log y = 1.4214 + 0.714 \log x$	0.91	9.49
Cement	22	34	$\log y = 0.3348 + 1.094 \log x$	0.71	4.46
Sulphuric acid	21	51	$\log y = 2.4236 + 0.423 \log x$	0.66	3.80
Non-ferrous metals	22	64	$\log y = 1.76956 + 0.637 \log x$	0.86	7.37
Total energy	22	66	$\log y = 0.6590 + 0.729 \log x$	0.95	13.37
Electric energy in industry	22	98	$y = 1149 x - 139 x^2 + 464$	0.77 *	16.42 *
Plastics	19	49	$\log y = 2.3869 + 0.654 \log x$	0.89	7.84
Textiles	22	29	$\log y = 1.2065 + 1.495 \log x$	0.84	6.93
Animal proteins	22	30	$\log y = 0.6871 + 1.475 \log x$	0.88	8.31
Cereals	22	37	$\log y = 7.6125 - 1.854 \log x$	−0.90	9.29
Sugar	22	36	$y = 215.9 x - 2.39 x^2 - 2.706$	0.79 *	18.83 *
Milk yield	22	32	$\log y = -0.2131 + 0.978 \log x$	0.73	4.75
Agricultural employment	22	78	$\log y = 3.4614 - 0.0143 x$	−0.89	8.53
TV sets	21	54	$y = 445.9 + 7.708 x$	0.85	6.91
Paper	22	53	$y = 194.7 + 41.1 x$	0.95	14.18
Letters	22	57	$\log y = 1.6566 + 0.719 \log x$	0.91	9.70
Telephones	22	65	$\log y = 1.6478 + 0.68 \log x$	0.92	10.81
Student enrolment	22	63	$y = -3.524 + 2.530 \log x$	0.75	5.00
Persons per room	22	40	$\log y = 3.0702 - 1.55 \log x$	−0.80	6.012
Infant mortality	22	144	$\log y = 3.4323 - 0.728 \log x$	−0.89	8.59
Passenger-cars	22	70	$y = 586 + 7.39 x$	0.915	10.15

[a] For more detailed descriptions, see Appendix table 4.I.

[b] Values of T equal to 2.8 and those of F to 5.7 correspond to 1 per cent significance level.

APPENDIX TABLE 4.III

Capital formation, 1965: Estimating equations

Non-monetary indicator Description	*Number of observations*	*Estimating equation*	*Coefficient of correlation*	*Value of T* [a]
Steel	22	$\log y = 0.4818 + 0.836 \log x$	0.91	10.10
Cement	22	$\log y = 1.097 + 1.41 \log x$	0.79	5.68
Sulphuric acid	11	$\log y = 1.6379 + 0.508 \log x$	0.68	4.04
Non ferrous metals	22	$y = 482.3 + 399.5 \log x$	0.82	5.99
Total energy	22	$y = 1.107 + 435.6 \log x$	0.85	7.16
Electric energy in industry	21	$\log y = 2.4852 + 0.619 \log x$	0.84	6.77

[a] Values of T equal to 3.7 correspond to 1 per cent significance level.

Appendix table 4.IV

Consumption, 1965: Estimating equations

Non-monetary indicator Description	*Number of observations*	*Estimating equation*	*Coefficient of correlation*	*Value of T*[a]
Plastics	19	$\log y = 2.3434 + 0.596 \log x$	0.85	6.63
Textiles	22	$\log y = 1.2453 + 1.379 \log x$	0.82	6.36
Animal proteins	22	$\log y = 0.6622 + 1.423 \log x$	0.90	9.04
Cereals	22	$\log y = 7.288 - 1.762 \log x$	−0.90	9.47
Sugar	22	$\log y = 3.490 - \frac{15.39}{x}$	−0.84	6.92
Milk yield	22	$\log y = -0.0575 + 0.899 \log x$	0.71	4.47
Agricultural employment	22	$\log y = 3.3273 - 0.013\, x$	−0.87	7.99
TV sets	21	$y = 308 + 6.07\, x$	0.86	7.38
Paper	22	$y = 163 + 30.9\, x$	0.94	11.75
Letters	22	$\log y = 1.6401 + 0.674 \log x$	0.90	9.12
Telephones	22	$\log y = 1.6440 + 0.631 \log x$	0.91	9.54
Student enrolment	22	$y = 492 + 5.99\, x$	0.77	5.45
Persons per room	22	$\log y = 2.9643 - 1.477 \log x$	−0.81	6.13
Infant mortality	22	$\log y = 3.3017 - 0.673 \log x$	−0.87	7.75
Passenger cars	22	$y = 430 + 5.759\, x$	0.93	11.12

[a] Values of T equal to 2.9 correspond to 1 per cent significance level.

APPENDIX TABLE 4.V

Per capita gross domestic product, 1965

(In dollars)

Country	*At official exchange rate in 1965*	*ECE physical indicators estimates in " average " prices*	*Standard error of estimate (dollars)* [a]	*" Confidence limits " at 5 per cent significance level (as percentage of average estimates)* [a]
Austria	1 273	1 459	57	±8
Belgium-Luxembourg	1 782	1 886	74	±8
Denmark	2 132	1 820	76	±9
Finland	1 750	1 585	87	±11
France	1 922	1 616	58	±8
Western Germany	1 913	1 854	64	±7
Greece	677	758	63	±18
Ireland	943	1 239	66	±11
Italy	1 021	1 190	50	±9
Netherlands	1 537	1 796	64	±7
Norway	1 910	1 668	58	±7
Portugal	405	733	57	±16
Spain	680	939	55	±12
Sweden	2 536	2 171	86	±8
Switzerland	2 274	1 863	105	±12
Turkey	284	333	25	±16
United Kingdom	1 802	1 929	73	±8
Japan	868	1 293	92	±15
Canada	2 500	2 218	90	±9
United States	3 553	2 597	126	±10
Australia	2 057	1 889	71	±8
New Zealand	1 999	1 850	107	±12
Bulgaria	..	877	87	±21
Czechoslovakia	..	1 427	110	±16
Eastern Germany	..	1 437	92	±13
Hungary	..	1 015	73	±15
Poland	..	989	93	±20
Romania	..	697	63	±19
Soviet Union	..	1 053	121	±24
Yugoslavia	..	692	55	±17

---

[a] Based on the assumption of randomness of the sample; see text.

Appendix table 4.VI

Per capita gross domestic fixed capital formation, 1965

(In dollars)

Country	*At official exchange rate in 1965*	*ECE physical indicators estimates in " average " prices*	*Standard error of estimate (dollars)* [a]	*" Confidence limits " at 5 per cent significance level (as percentage of average estimates)* [a]
Austria	326	381	42	±29
Belgium-Luxembourg	386	464	31	±17
Denmark	465	345	41	±31
Finland	454	397	27	±18
France	417	393	17	±11
Western Germany	503	490	37	±20
Greece	163	181	33	±47
Ireland	192	246	39	±41
Italy	208	323	13	±11
Netherlands	383	369	18	±13
Norway	542	469	111	±61
Portugal	70	147	33	±59
Spain	155	268	23	±22
Sweden	588	543	49	±23
Switzerland	639	489	94	±50
Turkey	39	45	10	±56
United Kingdom	324	417	44	±27
Japan	274	332	16	±12
Canada	606	536	57	±28
United States	616	535	55	±27
Australia	558	433	44	±27
New Zealand	473	310	16	±13
Bulgaria	..	274	26	±25
Czechoslovakia	..	437	36	±22
Eastern Germany	..	422	37	±23
Hungary	..	282	35	±32
Poland	..	306	29	±25
Romania	..	223	29	±34
Soviet Union	..	353	35	±26
Yugoslavia	..	208	29	±36

---

[a] See footnote to Appendix table 4.VII.

APPENDIX TABLE 4.VII

Per capita total consumption, 1965

(In dollars)

Country	*At official exchange rate in 1965*	*ECE physical indicators estimates in " average " prices*	*Standard error of estimate (dollars)* [a]	*" Confidence limits " at 5 per cent significance level (as percentage of average estimates)* [a]
Austria	944	1 061	27	±5
Belgium-Luxembourg	1 390	1 351	65	±10
Denmark	1 666	1 493	42	±6
Finland	1 270	1 156	76	±14
France	1 482	1 198	55	±10
Western Germany	1 375	1 319	52	±8
Greece	574	582	49	±18
Ireland	811	1 044	68	±14
Italy	851	860	41	±10
Netherlands	1 137	1 452	53	±8
Norway	1 346	1 285	45	±7
Portugal	350	597	50	±18
Spain	526	680	42	±13
Sweden	1 944	1 579	78	±10
Switzerland	1 621	1 418	80	±12
Turkey	249	296	35	±25
United Kingdom	1 474	1 477	58	±8
Japan	566	955	92	±20
Canada	1 862	1 638	69	±9
United States	2 281	2 023	125	±14
Australia	1 506	1 451	61	±9
New Zealand	1 505	1 538	80	±11
Bulgaria	..	573	66	±24
Czechoslovakia	..	935	73	±16
Eastern Germany	..	959	55	±12
Hungary	..	715	52	±15
Poland	..	646	64	±21
Romania	..	464	44	±20
Soviet Union	..	655	86	±28
Yugoslavia	..	479	44	±19

---

[a] See footnote to Appendix table 4.V.

OTHER RECENT ECE PUBLICATIONS

Recent publications by the ECE secretariat, in addition to the annual *Economic Surveys of Europe* and the trade reviews contained in the *Economic Bulletins for Europe*, have included:

Incomes in Postwar Europe: A Study of Policies, Growth and Distribution (*Economic Survey of Europe in 1965*, Part 2)
Sales No.: 66.II.E.14 Price: $(US) 6.50 Published in 1967

Macro-economic Models for Planning and Policy-making
Sales No.: 67.II.E.3 Price: $(US) 2.50 Published in 1968

Policies and Means of Promoting Technical Progress
Sales No.: 69.II.E.7 Price: $(US) 2.50 Published in 1969

Methods of making import/export projections (*Economic Bulletin for Europe, 1967*, Volume 19, No. 2)
Sales No.: 68.II.E.5 Price: $(US) 1.50 Published in 1968

Note on institutional developments in the foreign trade of the Soviet Union and eastern European countries
A note on the New Delhi session of UNCTAD and implications for international trade of changes in technology and industrial structure (*Economic Bulletin for Europe, 1968*, Volume 20, No. 1)
Sales No.: 69.II.E.3 Price: $(US) 2.50 Published in 1968

Economic development in the Byelorussian SSR
Foreign trade developments in southern European countries (*Economic Bulletin for Europe, 1968*, Volume 20, No. 2)
Sales No.: 69.II.E.11 Price: $(US) 1.00 Published in 1969

Trade dependence in European countries, 1953 to 1967
Industrial co-operation as a factor in the growth of east-west European trade
New uses of steel in the developing countries (*Economic Bulletin for Europe, 1969*, Volume 21, No. 1)
Sales No.: 70.II.E.3 Price: $(US) 3.00 Published in 1970

Multi-level planning and decision-making
Sales No.: 70.II.E.2 Price: $(US) 3.00 Published in 1970

HOW TO OBTAIN UNITED NATIONS PUBLICATIONS

United Nations publications may be obtained from bookstores and distributors throughout the world. Consult your bookstore or write to: United Nations, Sales Section, New York or Geneva.

COMMENT SE PROCURER LES PUBLICATIONS DES NATIONS UNIES

Les publications des Nations Unies sont en vente dans les librairies et les agences dépositaires du monde entier. Informez-vous auprès de votre librairie ou adressez-vous à: Nations Unies, Section des ventes, New York ou Genève.

КАК ПОЛУЧИТЬ ИЗДАНИЯ ОРГАНИЗАЦИИ ОБЪЕДИНЕННЫХ НАЦИЙ

Издания Организации Объединенных Наций можно купить в книжных магазинах и агентствах во всех районах мира. Наводите справки об изданиях в вашем книжном магазине или пишите по адресу: Организация Объединенных Наций, Секция по продаже изданий, Нью-Йорк или Женева.

COMO CONSEGUIR PUBLICACIONES DE LAS NACIONES UNIDAS

Las publicaciones de las Naciones Unidas están en venta en librerías y casas distribuidoras en todas partes del mundo. Consulte a su librero o diríjase a: Naciones Unidas, Sección de Ventas, Nueva York o Ginebra.

Printed in Switzerland
0342–January 1971–3,745
Reprinted in U.N.
71–04882–March 1971–2,825

Price: $U.S. 2.50
(or equivalent in other currencies)

United Nations publication
Sales No.: E.70.II.E.1
E/ECE/753/Part 1